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HP Professional

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JUNE 1988

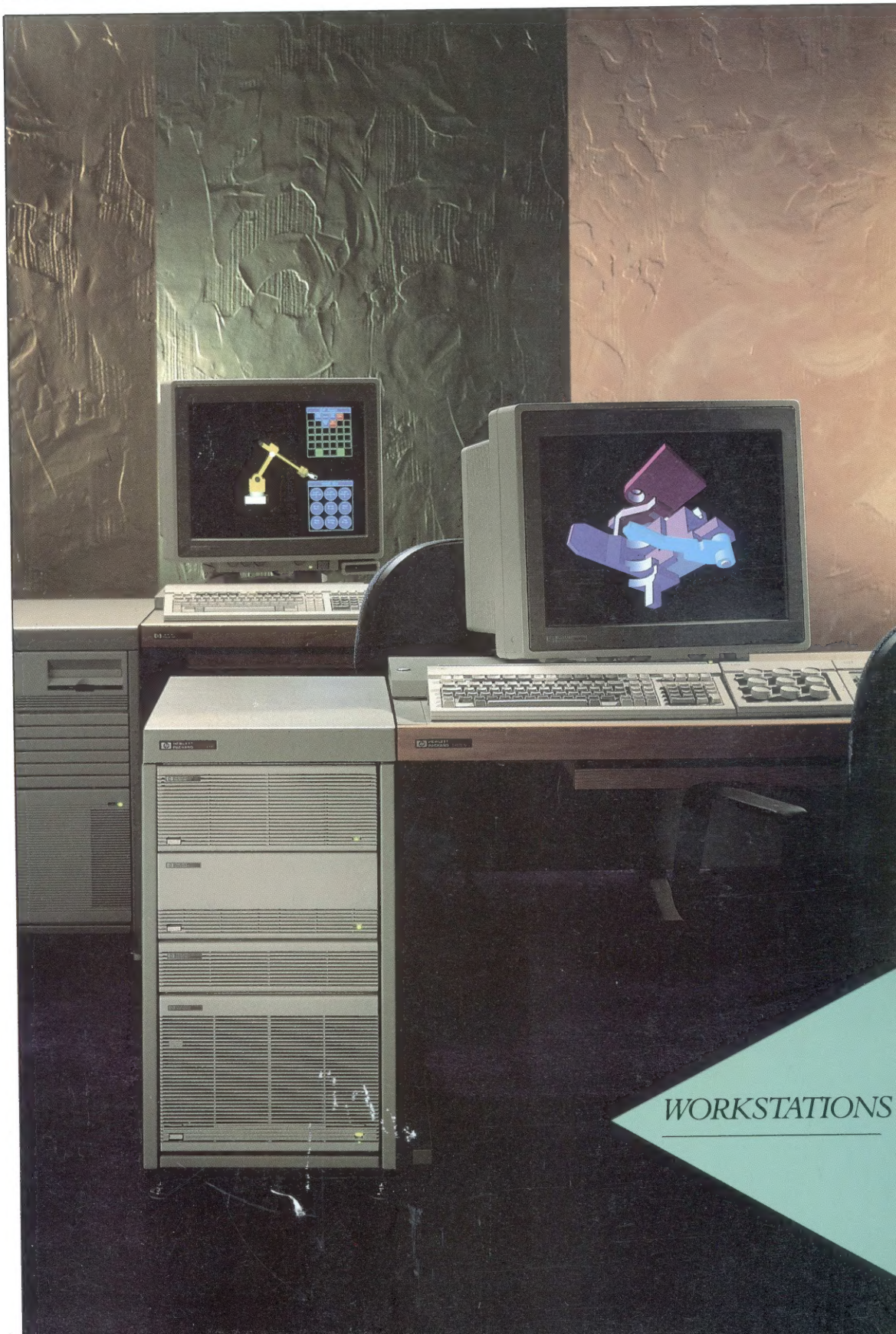
Scientific Visualization

Workstation-To-PC Data Link

Quality Software Walk-Throughs

INDUSTRY WATCH

Has Our Leadership In Innovation Declined?



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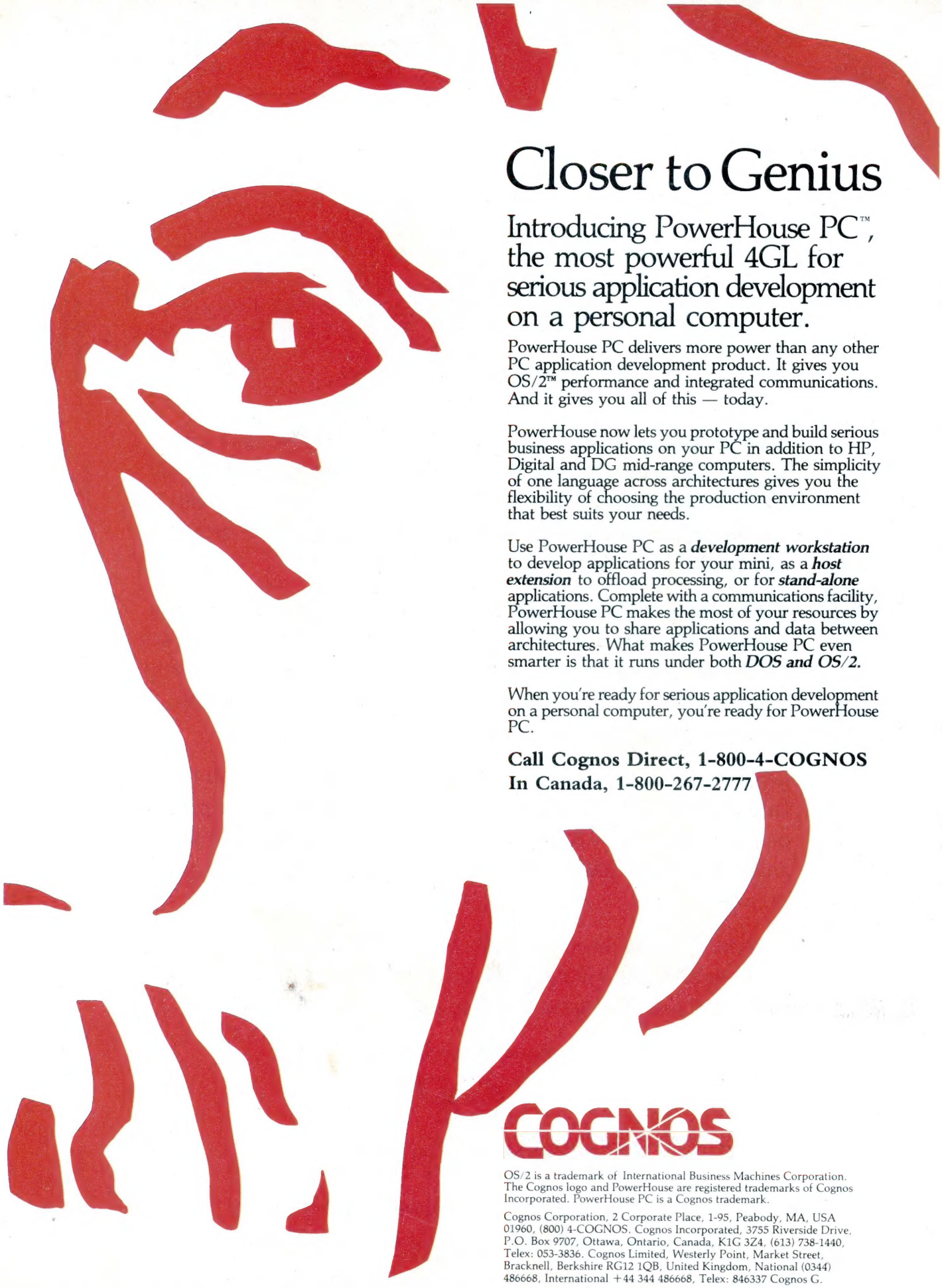

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In short, if you've been puzzling over how to get the most from your LaserJets and your HP3000, the Laser Toolkit may be just your piece. Call us for a demonstration tape today!

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FOCUS
Workstations
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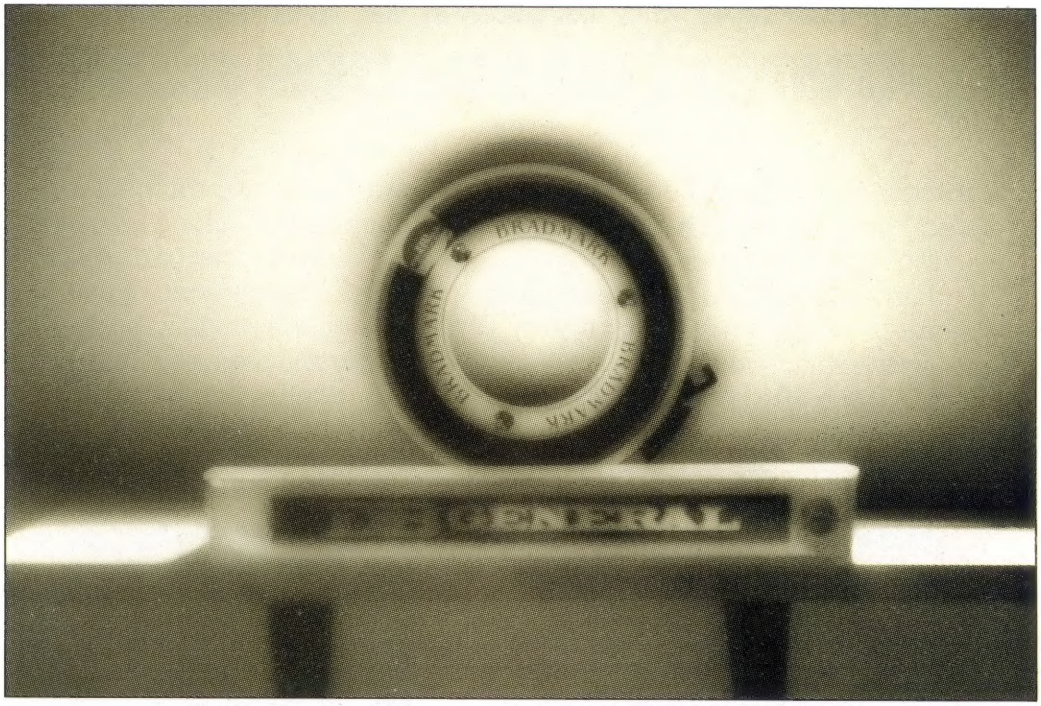
DON'T STORE IN A COOL, DRY PLACE



If this is where you keep your database maintenance utility, you've got the wrong one. IMAGE and TurboIMAGE database maintenance means more than capacity changes—it requires regular analysis and tuning to maintain optimum performance and avoid problems.

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Entry-level, 8086 compatible

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And every single HP Vectra PC offers something no other PC can: HP's

we never stop asking

"What if...?"

High-level, 80386 based

long established reputation for quality and reliability.

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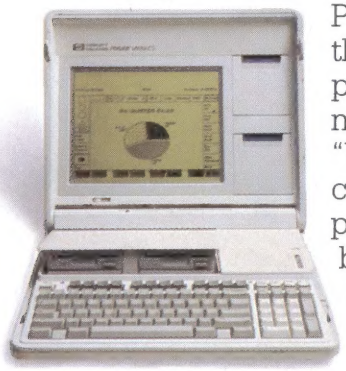

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- Separate mouse/graphics tablet port included
- 80387 and Weitek 1167 co-processor support

HP Vectra ES and ES/12 Personal Computers
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- Choice of 8 or 12 MHz, 80286-based microprocessors
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- 7 accessory slots for expansion
- 20 and 40 Mbyte hard disc models
- Both 5.25 and 3.5 inch flexible disc drives supported internally
- Separate mouse/graphics tablet port included

HP Vectra CS Personal Computer
Entry-level, 8086 compatible

- 7.16 MHz, 8086-compatible microprocessor with zero wait states
- Up to 8 Mbytes of expanded memory, addressable via LIM 3.2 expanded memory specification
- 7 accessory slots for expansion
- 20 Mbyte hard disc model
- Both 5.25 and 3.5 inch flexible disc drives supported internally

HP Portable Vectra CS Personal Computer
8086 compatible

- 7.16 MHz, 8086-compatible microprocessor with zero wait states
- Up to 6 Mbytes expanded memory, addressable by LIM 3.2
- Four I/O slots
- Supports two 3.5 inch flexible disc drives
- 20 Mbyte internal hard disc model available
- Up to 10 hour battery life
- IBM style keyboard

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CIRCLE 117 ON READER CARD

Perilous Times

Have you tried to buy memory chips lately? If you have, you share my shock and disgust.

Thanks to a subtle combination of legislative muddling and protectionism, the government and the industry have left us in the hands of a new OPEC, or should I call it OCEP (organization of chip exporting countries).

Almost every company in the U.S. that was producing memory chips abandoned the business a few years ago as they were out-gunned and out-teched by Japan, Inc. Noticing this, our wise government decided to raise the price by slapping price controls on the import of chips. This tipped the Japanese off to the fact that they now totally control production and, by throttling the production, can charge anything they want for the chips and blame it on our government.

If you haven't looked lately, the price of a megabit DRAM is hovering around $50 at retail; not bad for a piece of silicon that costs about a quarter to make. Oil is passé.

How bad is the shortage? I have a friend with a PC surplus store in the Valley. He's buying old memory boards and *unsoldering* the chips for resale.

So, why don't all our noble domestic semiconductor makers jump into the fray and tool up? After all, there's money to be ripped off here!

The answer is that the time required to tool up and bring the process on stream is so great that the next generation (4 MB or bigger) will have arrived and the opportunity vanished before they could have economical yields from their 1-MB process.

The catch-22 is that unless you commit money and time to process development, you're permanently out of the business because you don't have the expertise and experience gleaned from the last generation to apply to the next.

The other side of the problem is that American business is chronically unable to invest in the future. Unless a business plan will show results in a quarter or two, you can not sell the idea to a quarterly-report-driven management.

Perhaps the only bright light on the horizon is the nascent Sematech consortium. This is a government/industry-funded effort to pry open the 4-MB generation by building the capacity jointly. After all, individual corporations really can't compete with the government-subsidized Japanese.

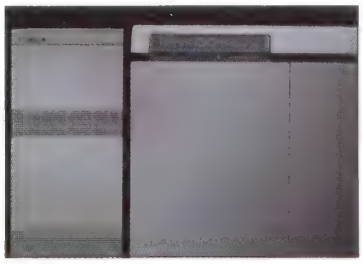
In the mean time (which promises to be quite long), you and I will have to pay large multiples for our new memory boards. It's gonna make the $1.50 gallon look good!

Introducing FALCON XP: The only disc subsystem with 64K of write cache.

Lightning strikes twice! EMC has taken the fastest disc subsystem for your HP 3000 and made it even faster. In recent independent benchmark testing the Falcon, without write cache, won the race over HP's Eagle drives. Now we've added 64K of non-volatile write cache to the controller to bring you the FALCON XP, a lightning-quick solution to your I/O bottlenecks.

Now with twice the read cache and 16 times the write cache available from HP, the FALCON XP can address any size read or write. This means you'll get even faster system response time — **up to 7-20% faster than any drive offerings to date!** And, with the FALCON XP you can still take advantage of EMC's other features like our proprietary caching algorithm, which allows you to tune cache domains to fit your application and guarantee maximum performance.

Call today to find out how the FALCON XP can cut through your I/O bottlenecks. It's a winning decision! For more information, contact your local EMC representative or call: **1-800-222-EMC2 X2290.** (In Mass., 617-435-1000.)



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CIRCLE 136 ON READER CARD

INDUSTRY WATCH

Lonni Wright

The Competitive Edge

In hopes of raising editors' awareness in the interest of readers, Hewlett-Packard's Technical Systems Sector hosted its First Annual Engineering Editorial Seminar April 24-27 in Tucson, AZ. Editors from business, technical and HP-specific publications were invited to a series of presentations aimed at educating us about the trends in the engineering and design automation market and about gaining a competitive advantage.

The seminar featured industry experts from leading companies and speakers from consulting firms, education and government. It was the first of what HP plans to be an annual event intended to get information to the readers about the importance of improving their engineering productivity and therefore their competitiveness.

Many of the speakers expressed concern over the U.S.'s diminishing position in the worldwide engineering market. In addressing this issue, they spoke about the role of industry, government, education and the general public, stressing that technology — unique products and increased productivity — is the foundation for a high U.S. standard of living.

Tom Uhlman, director of Corporate Development at HP and spokesman for the Council on Competitiveness, a follow-on council to President Reagan's Commission on Industrial Competitiveness, posed a disturbing question to the group: "Has the U.S.'s leadership in innovation declined?" According to recent statistics it has:

Has the U.S.'s leadership in innovation declined? According to recent statistics it has.

- *In 1986, the U.S. high-tech trade deficit was $3 billion—the first deficit ever in that area (see Figure 1).*
- *Imports and exports represent a larger portion of the GNP than it did 20 years ago.*
- *According to the U.S. Department of Commerce, the nation's share of domestic consumption (based on U.S. production) showed a drastic decrease between 1980 and 1987. In computing, the U.S. share dropped 30 percent.*
- *The U.S. Patent Office recently reported that the percentage of U.S. patents awarded annually to foreigners has steadily increased since 1979. About 45 percent went to foreigners in 1987; the Japanese share of U.S. patents has more than doubled.*
- *70 percent of Federal funds for research and development are defense-related, compared with four percent for energy R & D, five percent for space research and technology R & D, 10 percent for health R & D and 12 percent for other R & D. The Japanese spend only three percent on defense-related R & D; the United Kingdom 52 percent.*
- *There has been a 95 percent decrease in funding to university research in the past 20 years.*

So, what can be done? According to Uhlman, work done by the Council on Competitiveness shows that commercialization of technology needs to be established as a national priority; government should set standards, increase funding and incentives, and review the impact of current trade regulations. Giving the President's science advisor a more important role and establishing a new cabinet level of the science and technology agency could displace the role that the Defense Department has taken and could link technology and economical development committees.

As for the private sector, Uhlman stressed the importance of industry forming a closer alliance with universities, investing in research and development with long-term perspectives in mind, providing lifelong work force education and incorporating the role of management into the process.

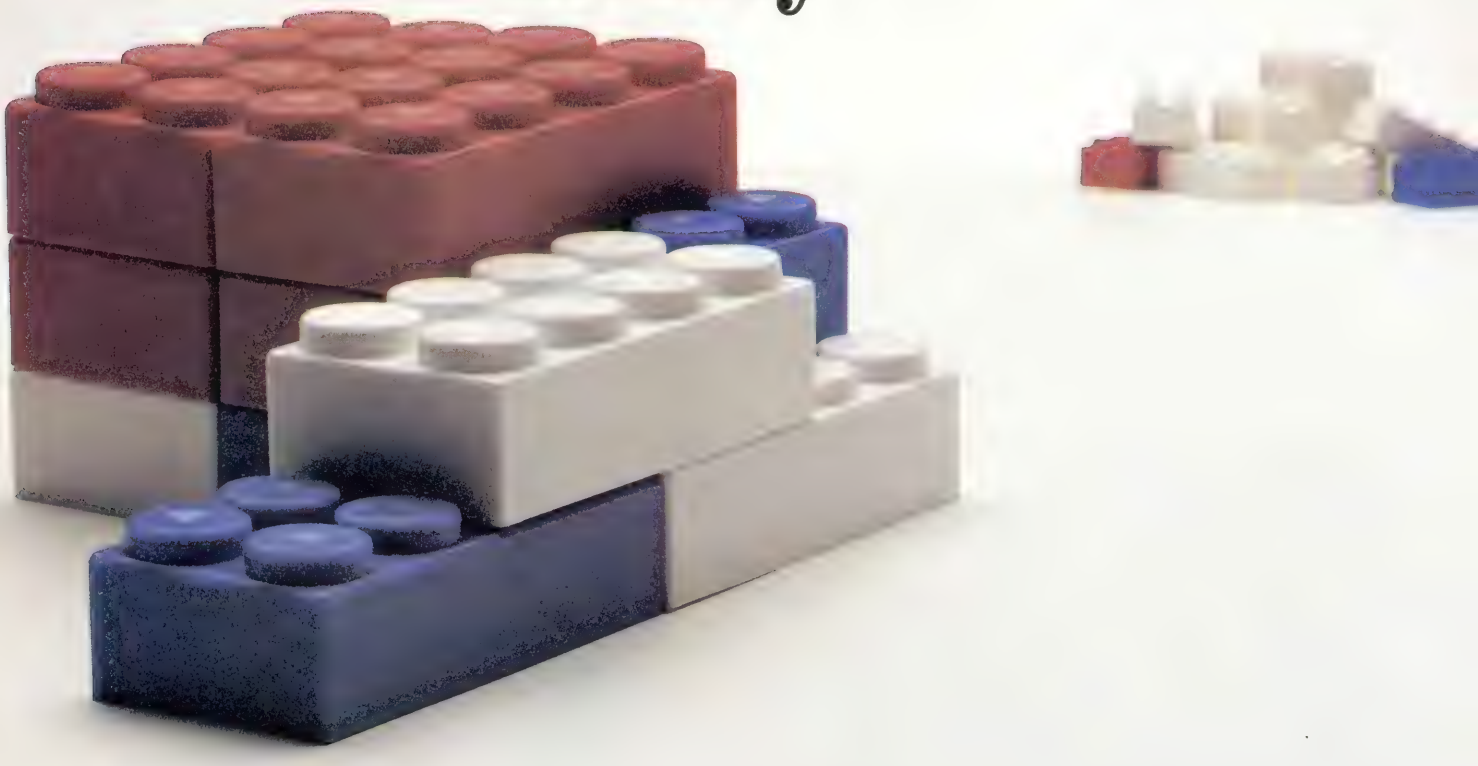
A Closer Look

To gain a competitive advantage, we need to take a closer look at the relationship between engineering, manufacturing and management. The keys to capturing more benefits from available technology lie in management approaches as well as in improved technology. While technical workstations and CAD/CAM/CAE technology can boost competitiveness by improving product development performance, experts see management discipline as being as important as these tools.

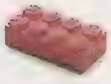
While workstation performance has doubled every year since 1983, many predict that the war among workstation vendors will move from MIPS to the ability to provide solutions and services.

According to Lew Platt, executive vice president of the Technical Systems Sector, it's important for companies to

Customize your own information center facility . . .



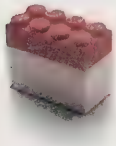
with the DataExpressSeries modular approach.



FOUNDATION: The core module of the DataExpressSeries links end users to their data on the HP3000. It accesses IMAGE™, KSAM, MPE and SD files to select, compute, sort, reformat and download data to PC applications.

STRUCTURE: The DataExpressSeries has a common menu and catalog structure. Full function key support provides even easier end user access to data. With Reflection®, downloads are automatic.

BUILDING: PowerHouse, Dictionary, RELATE and Omnidex Interfaces are available for enhanced access to your data. The DataCatalog option allows "views" of complex data structures to be defined for end users and security to be defined at the field value. The PrintLocal option gives end users access to their spooled output on their local printers.



In short, the DataExpressSeries is a simple, powerful information center solution to meet your needs and budget today. Since you can add options and interfaces at any time, it provides a clear growth path to solving all your HP3000 data interchange needs in the future.

So, if you want to expand the power of your information center, call IMACS and ask how the DataExpressSeries can help you and your end users.

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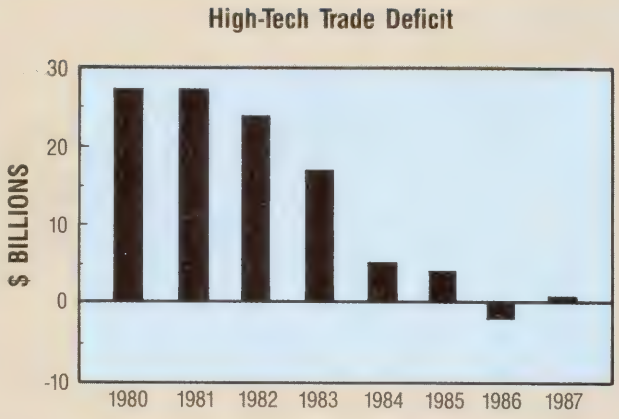
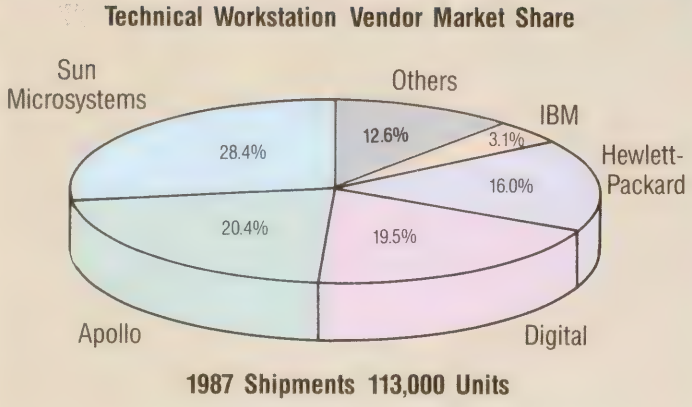
FIGURE 1



Source: Council for Industrial Competitiveness

FIGURE 2



Source: Dataquest

initiate "breakthrough thinking" — making others make necessary changes and commit to forming the important link between engineering, manufacturing and management. "Traditional notions and organizations don't work," he said. "To survive, [a company] must be open to new ideas."

Hal Edmondson, vice president of corporate manufacturing at HP, added, "It's important to set extremely high goals for ourselves... R & D and manufacturing need to work hand in hand; if one fails, the other does."

HP Faces The Challenge

With a long-term goal of becoming the industry leader in the workstations/design automation market (HP now has a 16 percent share of the technical workstations market; see *Figure 2*), HP is committed to improving the competitive impact of its customers' design teams and their design process by providing a broad range of products and services that enhance their ability to design higher quality, lower cost products in less time.

To work toward reaching this goal, HP's plans to have one engineering workstation per engineer in its own engineering environment. Currently, 95 percent of HP's development engineers have workstations; 69 percent of those engineers do software development, 55 percent on a UNIX network.

HP also is committed to supporting standards, now and in the future, to obtain a better position in the market:

■ **Local Area Networking:**
Berkeley/ARPA on IEEE 802.3, Ethernet
ISO, MAP/TOP
Gateway to Hyperchannel, SNA, DECnet
X Windows, NFS
X.25 wide area network
VT100, 3270 emulation

■ **Operating Systems:**
AT&T's UNIX System V Interface Definition (Issue 2) with BSD 4.2 enhancements
PC-DOS

■ **Languages:**
FORTRAN 77, PROLOG, Common LISP, PASCAL, ADA, C

■ **Graphics/Design Files:**
GKS libraries
IGES file format
EDIF
PHIGS

■ **Data Management:**
SQL

With these commitments, HP continues to improve its engineering productivity and therefore sharpen its competitive advantage. Company representatives feel that the U.S. is still the leader in innovation and, as Lew Platt said, "Engineering can save us from being a service country." ■

Two ways to solve your system backup problem: BackPack™ ... and BackPack!

BackPack offers two ways to lighten the burden backup places on data center operations. First, you can take the 'traditional' approach, simply substituting BackPack for HP STORE in your job streams. BackPack cuts backup time by 35-50% on most systems, and halves tape usage as well. What's more, by incorporating DBSTORE into daily backup, BackPack eliminates the need to backup each database separately — an additional time and tape savings for IMAGE users.

A second alternative is to institute unattended backup procedures. In BackPack's "operatorless" mode, you start the store, mount a tape, and leave. BackPack fills the first reel, stores remaining data in compressed format to disc, and resets all store bits. In the morning, you copy the data to tape concurrent with normal system usage. For an unattended full dump, you need one-third of your total disc space free. With less space, you can probably still do daily backups unattended and full dumps partly unattended.

With versatile options like these, BackPack solves just about any HP 3000 backup problem. Why not put BackPack to work for you?

BackPack. From Tymlabs.

Tymlabs

Tymlabs Corporation ■ 811 Barton Springs Road ■ Austin, Texas 78704, U.S.A. ■ (512) 478-0611 ■ Telex 755820
Tymlabs-APPIC ■ 123 Rue de Petit-Vaux ■ 91360 Epinay sur Orge, France ■ (1) 64-54-82-32 ■ Telex 603409
Wick Hill Associates Limited ■ 42A-44 High Street ■ Egham, Surrey, England TW20 9DP ■ 0784-38441 ■ Telex 268764
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CIRCLE 140 ON READER CARD

NEWS & TRENDS

HP To Sell QMS Accessory Kit For LaserJet Series II Printer

Continues To Support HP PCL Printer Language Standards

Hewlett-Packard has announced it is selling the QMS Jetscript accessory kit for the HP LaserJet Series II printer. The JetScript accessory kit allows LaserJet Series II users to add the Adobe-licensed PostScript page-description language to the printer.

By offering the JetScript accessory kit, HP continues to support printer-language standards that complement the HP PCL printer language. The HP PCL is the resident language in the LaserJet family, and in HP personal printers including the PaintJet color printer and the recently introduced DeskJet personal printer.

The JetScript accessory kit ($2,795) provides a PostScript solution for the LaserJet Series II user. The kit consists of two printed-circuit boards, one of which plugs into the backplane of an HP Vectra PC, IBM XT/AT or compatible, or PS/2 Model 30 PC.

The second circuit board plugs into the I/O slot on the back of the LaserJet Series II printer. The JetScript accessory kit is designed so that a customer easily can install the boards.

The HP LaserJet Series II printer still can be connected to a PC through the standard serial- or parallel-printer interface. Changing from the JetScript PostScript controller to the PCL printer-language controller is accomplished by selecting the appropriate printer driver in the user's software package menu.

The JetScript accessory kit includes 3 MB of memory and 35 licensed typefaces. The kit allows users to perform online font scaling within a software package to change font sizes. Additional Adobe font products also can be used.

Cumulus Offers Five-Year Warranty

First Time Offered For Terminal Industry

Citing improvements in product design made possible by advanced technology, Cumulus Technology new terminal carries the industry's first five-year warranty.

The limited warranty covers five years of free parts and labor. For the first 12 months, Cumulus offers a 24-Hour Exchange Program initiated by calling a Cumulus Authorized Service Center. During the remainder of the warranty, a Return for Repair Program is in effect.

The warranty is made possible by Cumulus' use of custom VLSI (very large-scale integration) technology and proprietary analog video circuitry. Besides allowing high performance, CMOS VLSI substantially increases reliability by reducing heat and power consumption and requiring fewer parts.

Computer Solutions Opens Chicago Area Sales Office

Forrest Appleton To Head Midwest Sales

In February, Computer Solutions (Orange, NJ) announced the addition of a regional sales office in the Chicago area to serve its Midwest customer base.

CSI is a leading dealer of remarketed HP equipment as well as an HP value-added reseller. A large inventory includes HP 1000 and HP 3000 CPUs and peripherals.

CSI named Forrest L. Appleton to head up the company's Midwest sales operations. The company's sales offices include the Orange, NJ, headquarters on the East coast, a Torrance, CA, branch on the West and now, a Chicago office in the Mid-West.

Kelly Computer Systems recently shipped add-in memory boards for the HP 3000 Series 950 (shown here) and HP 9000 Series 850 RISC-based machines.

Kelly Ships First Add-In Memory For Series 950, 850

First Hardware Products Designed For RISC-Based Machines

Kelly Computer Systems recently announced that it has shipped its first add-in memory boards for the HP 3000 Series 950 and HP 9000 Series 850, making it the first vendor to supply a hardware product specifically designed for these RISC-based computers.

The 950 and 850 versions of Kelly's Model 3950A provide 16 MB of memory and are fully compatible with the HP systems. The memory subsystem uses 1 Mbit Nibble mode dynamic RAMs with an access time of 120 ns. System features such as single bit error correction, double bit error detection, memory error logging, and battery backup are fully supported.

User features such as an online/offline convenience switch, online LED indicator and activity LED indicator are also included.

Memory will increase performance in the Series 850 and 950 because RISC means simpler instructions that execute in a single clock cycle. The performance of a given function in RISC (vs. CISC) requires more instructions, thus more memory, but fewer clock cycles, thus better performance.

Program code expands by a factor of four to 10 in moving from classic architectures to the HPPA machines, but execution times improve by 20 to 80 percent.

In addition to RISC hardware, memory will improve the performance of the Series 850 because it runs HP-UX. HP-UX has a set of capabilities designed to lock in memory processes, data, stack and shared memory segments to avoid unexpected swapping and paging.

MPE/XL, which the Series 950 runs, has a new, powerful method of accessing data on disc, called mapped files. Mapped files are a superior version of the disc-caching capabilities offered in MPE/V. The memory manager in MPE/XL uses improved algorithms to prefetch data from disc into available main memory in anticipation of user needs; this improves overall system performance by eliminating future I/Os to disc.

Schweber Electronics Adds HP 204-MB Disc Drive To Product Line

Plans To Distribute HP 97533 Drives

Schweber Electronics (Westbury, NY), one of the nation's largest distributors of computer-peripheral products, is adding the 204-MB, 5¼-inch Winchester disc drive from Hewlett-Packard to its product line. Schweber already markets HP's 408-MB, 5¼-inch drive.

Schweber will begin distributing the HP 97533 drives, which have an embedded SCSI (small-computer-system interface) or ESDI (enhanced, small-device interface) controller. Each HP 97533S and 97533E disc drive has a 17-ms average seek time and an MTBF rate of 40,000 hours.

Schweber Electronics was the first distributor to sign under HP's Peripherals Distributor program developed in 1987.

ALLBASE/XL Eases Migration From MPE To MPE/XL

No Conversion Required For Native Mode Performance In HPPA

In response to customer requests, HP's Commercial Systems Division has announced changes in its strategy for ALLBASE/XL, the database management system for the HP 900 Series Precision Architecture systems. HP has replaced HP IMAGE with TurboIMAGE/XL so users no longer have to switch to HP IMAGE when they move up to the 900 Series.

After a two-step migration, programs and data from MPE V systems can run in native mode on MPE/XL systems with no conversion required.

The first step in migration is to store and restore TurboIMAGE/XL data and programs from a system running MPE V to compatibility mode on a Series 900 MPE/XL system. The program running in compatibility mode then can be recompiled to run in native mode. The same version of the source code can be run on either system and the interface to the data is identical.

The ALLBASE/XL product is a combination of TurboIMAGE/XL, HP's network model interface and HP SQL, the relational model interface built on the industry standard relational query language SQL.

A future release of ALLBASE/XL will make it easier for ALLBASE customers to move between network and relational data models by allowing HP SQL users to employ that query language to read existing TurboIMAGE data structures.

INGRES RDMS Ported To HP 3000 Series 900 Systems

Offers RDBMS Tools To More HP Users

Relational Technology Inc. has announced a port for the INGRES relational database management system to HP 3000 Series 900 computers. The port enables users to access sophisticated user interfaces and development tools.

"The availability of INGRES on the HP 3000 Series 900 further enhances the proven solutions available for HP's Precision Architecture systems," said Bob Stamps, marketing manager of HP's Commercial Systems Information Management Marketing. "The large installed base of INGRES users also can now utilize the price/performance leadership of the HP 3000 Series 900."

The INGRES port allows INGRES to be used as the basis for applications supported by the 900 Series, including the manufacturing, government, automotive and telecommunications markets. The product will be marketed by both Relational Technology and Hewlett-Packard.

INGRES, a distributed relational database system, enables organizations to access data spanning a variety of computer systems connected in a network. The INGRES family of products is available for all strategic micro, mini and mainframe operating environments.

Unison's MAESTRO Wins ICP Software Award

Sales In Excess Of $1 Million

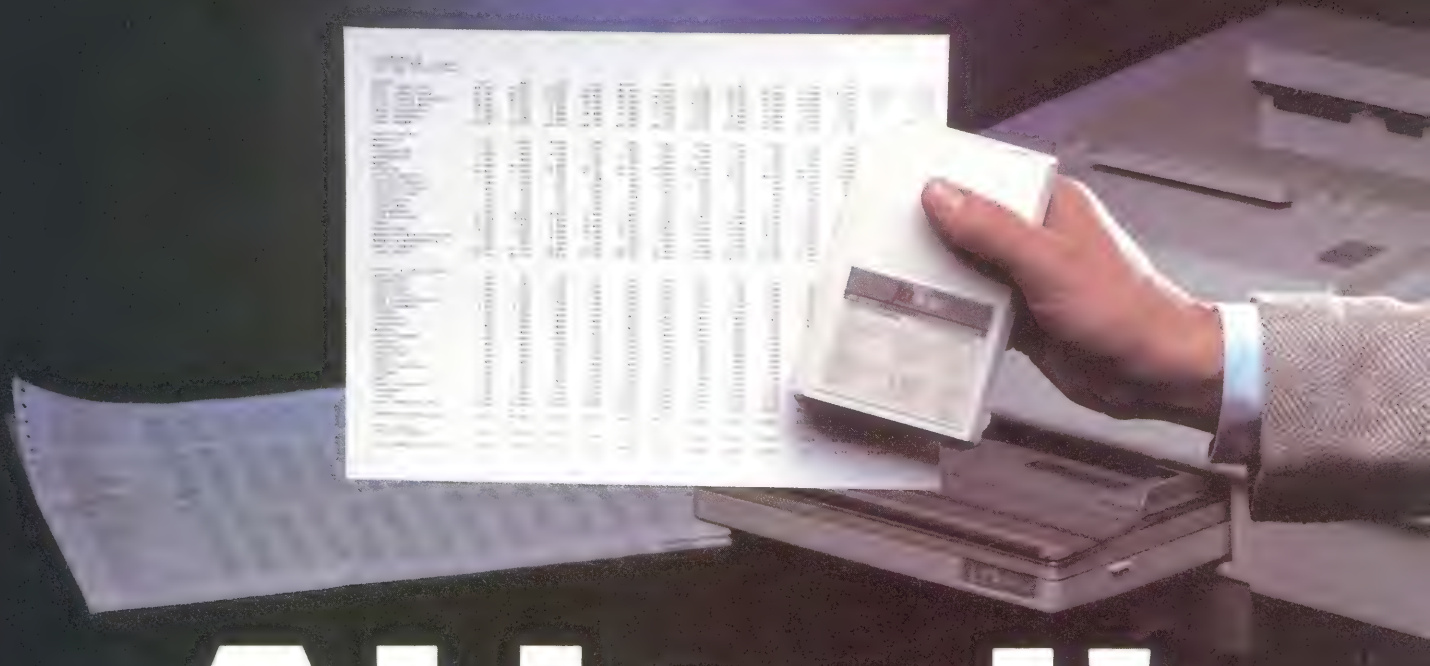
Unison Software has announced that MAESTRO, the HP-preferred batch job management system, is a recipient of the International Computer Programs Inc. (ICP) Million Dollar Software Award, for software products with sales in excess of $1 million.

MAESTRO will be honored at the 17th Annual ICP Million Dollar Awards Conference & Ceremonies, April 20-22 in Atlanta.

"The key to MAESTRO's success is its ease of use, along with its facility for networking and handling inter-CPU dependencies," said Michael A. Casteel, executive vice president of Unison and architect of MAESTRO. First introduced in early 1985, MAESTRO has undergone several updates and enhancements.

MAESTRO's other features include automatic job initiation, control of user-streamed jobs, customized calendars and automatic substitution of date parameters.

1-2-3 8½x11



At last!

JetFont 123 has just made greenbar paper obsolete.

JetFont 123 produces remarkably clean laser output from Lotus 1-2-3, dBase III and other popular database/spreadsheet programs. On 8½" x 11" paper. With four font sizes, as dense as 30 characters per inch!

JetWare's proprietary Lotica font was designed for exceptional readability, making it perfect for extra-wide spreadsheets and database tables. Horizontal or vertical, up to 240 columns wide. With outstanding visual clarity, even after it goes through the copy machine.

Manufactured by Computer Peripherals, Inc., a leader in IBM XT/AT enhancement products since 1982, the JetWare line includes a full range of font cartridges and memory expansion boards for HP LaserJet.

Jim Seymour of PC Week has called JetFont 123 "the answer to our prayers." You'll call it indispensable.

JETWARE™

Computer Peripherals, Inc.
667 Rancho Conejo Blvd.
Newbury Park, CA 91320
Toll Free: 800-854-7600
In CA: 805-499-5751
FAX: 805-498-8848

CIRCLE 210 ON READER CARD

'LOTUS 1-2-3 is a registered trademark of Lotus Development Corp. • LaserJet is a trademark of Hewlett-Packard Co
IBM XT and AT are trademarks of International Business Machines Corp. • dBase III is a registered trademark of Ashton-Tate Corp

Lotus Measure, now developed and marketed exclusively by National Instruments, is a software system for scientific applications requiring data acquisition and instrument control.

National Instruments Acquires Rights To Lotus Measure

Signs Agreement For Customer Support

National Instruments Corporation and Lotus Development Corporation have approved an agreement giving National Instruments exclusive rights to market and develop the *Lotus Measure* software system. Effective April 4, 1988, the agreement also stipulates that National Instruments will assume customer support responsibility for the installed base of *Lotus Measure* customers.

Lotus Measure ($495) is a software system for scientific applications requiring data acquisition and instrument control. *Lotus Measure* includes a set of data acquisition drivers for *Lotus 1-2-3* and *Symphony* that allows data to be acquired, formatted and stored directly into the spreadsheet. All functions normally available in the spreadsheet are available for immediate reduction, analysis and textual or graphics presentation.

Lotus Measure provides for the acquisition of data using GPIB, RS-232 and analog-to-digital interfaces. The GPIB routines provide 21 macro commands for using the National Instruments GPIB-PCII interface.

National Instruments has cooperated with Lotus in the development and marketing of the *Lotus Measure Software System* since 1985. National Instruments co-developed the IEEE-488 (GPIB) modules and participated in the *Lotus Measure* product introduction in October 1986 by conducting hands-on *Lotus Measure* seminars nationwide. National Instruments also has been a licensed OEM for *Lotus Measure* since the product's introduction.

Key to negotiating this agreement was National Instruments' desire to further expand the *Lotus Measure* market and product capabilities. *Lotus Measure* currently runs on IBM PC/XT/ATs and compatibles. National Instruments plans to adapt *Lotus Measure* to run on the IBM Micro Channel PS/2 Series.

The XL/3000 RAMDISC. Ends "I/O bottlenecks." Adds up to 120 MBs of memory.

What if you could boost read/write times on your HP 3000 by 1000% or more — to as many as 360, 400 or even 1000 per second? Cut sort times 20 to 50%? Reduce compile times by 10 to 40%? Raise overall application productivity 20, 30 — even as much as 50%?

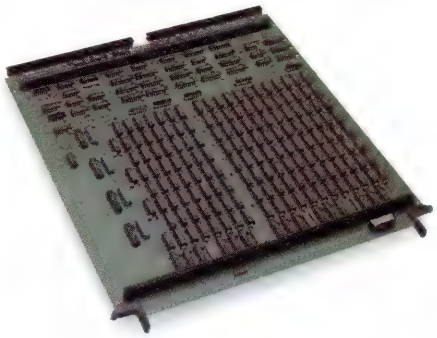
What if that performance came as plug-in data storage that adds 2 MBs or more of memory, that lets you grow memory by as much as 120 MBs? All without affecting MPE.

Raises possibilities. Not the least of which is postponing costly CPU upgrades. And the attendant software conversion. An attractive proposition.

And no pipe dream. The XL/3000 RAMDISC — the first device of its kind for HP 3000s — makes it a reality.

Shifts run time and response time into high gear

The XL/3000 RAMDISC offers information exchange at memory access rates. Its less-than-a-microsecond access time leaves conventional disc drives (25 to 35 milliseconds access time) far behind. Same for caching, with its typical 100



reads per second at best, not to mention other limitations.

RAMDISC implementation? The hardware goes in like a memory board. Add the software and configure RAMDISC as a typical storage device. In effect, you've created a battery-backed-up private volume. Achieved disc drive emulation — without the I/O overhead.

Begin by getting our free file-analysis tape — and target your most I/O-intensive files

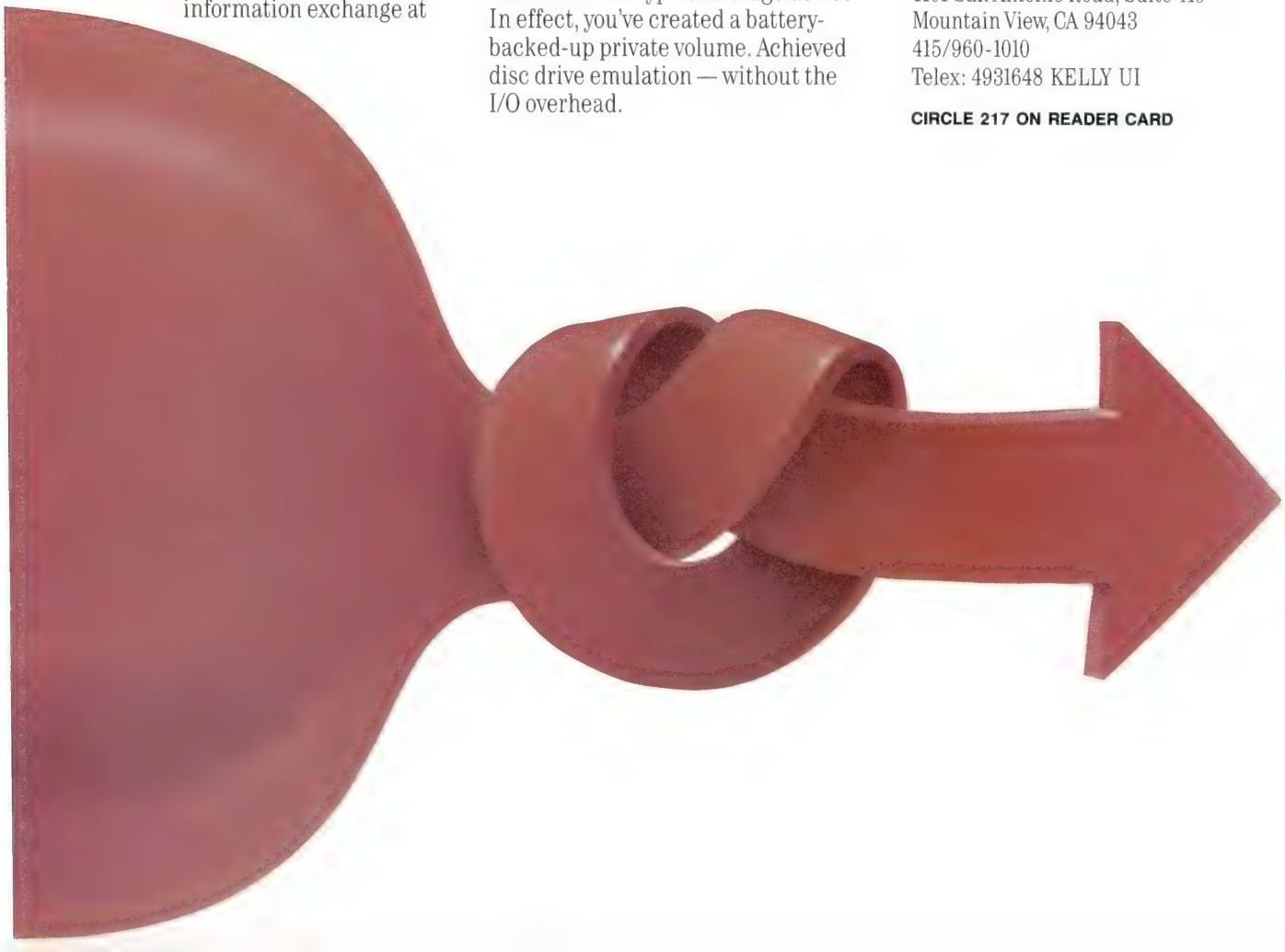
XL/3000 heightens performance virtually anywhere session temporary files play a significant role — from development machines and graphics-intensive applications to spreadsheets and editors. And it sharply improves on-line response time by its ability to move single data sets into RAMDISC.

Write or phone today. Arrange to receive our free easy-to-use file-analysis tape and an XL/3000 RAMDISC demonstration. You'll rapidly pinpoint I/O bottlenecks — and their solution.

KELLY
COMPUTER SYSTEMS

1101 San Antonio Road, Suite 419
Mountain View, CA 94043
415/960-1010
Telex: 4931648 KELLY UI

CIRCLE 217 ON READER CARD



Expertware CASE Tools Available On HP 9000 Series 300, 800

CMT, DST Porting Completed

Expertware Inc.'s configuration management and documentation support software products are now available on HP 9000 Series 300 and 800 technical computers.

Expertware has completed porting its Configuration Management Toolkit (CMT) and Documentation Support Toolkit (DST) to the HP computers.

CMT systematically controls changes and performs release management for all software, documentation and hardware items during all phases of the system life cycle. DST provides for online automatic document creation and completion.

Cognos, Interbase Sign Marketing, Product Development Agreement

Cognos Versions Of Interbase's RDBMS To Be Marketed With PowerHouse Software

Cognos Inc. has entered into a strategic marketing and product development agreement with Interbase Software Corporation (Tyngsborough, MA).

According to the terms of the agreement, Cognos will market Cognos versions of Interbase's RDBMS and distributed technology in conjunction with its PowerHouse application development language. Interbase will develop versions of its software for resale by Cognos in a number of computing environments including MPE XL, HP-UX, VMS, OS/2, MS-DOS and UNIX.

Interbase also will expand its support of multiple DBMSs. It currently supports Rdb and RMS under VMS and will provide integration with dBASE IV under a recently announced agreement with Ashton-Tate Corporation. Under the agreement with Cognos, Interbase will develop interfaces to other widely accepted DBMSs.

Interfaces to IBM's MVS and Data General's AOS VS environments are under negotiation.

Ashton-Tate Corporation, the California-based software vendor that is an equity investor in Interbase and plans to use Interbase as the basis for its next generation of workstation database products, has endorsed the agreement.

In addition to product development by Interbase, the agreement allows for ongoing technological exchanges between the companies and incorporation of Interbase technology in the architecture underlying Cognos' own language technology.

Corporate Computer Systems Installs Spectrum 800 Series

Continues Support Of HP 1000, 3000

In keeping with the introduction of HP Precision Architecture, Corporate Computer Systems has purchased an 800 Series Spectrum-class machine.

In-house development on the 825 will include the porting of several products from the CCS technical line, as well as turnkey systems and custom development work in the areas of manufacturing, data collection and process monitoring.

"We are being driven by our customer base to port several of our existing HP 1000 technical tools to the Spectrum class machines in order to provide a smooth transition to the new architecture. We will continue with our full line of software and support on the HP 1000 and 3000 systems," said Joan Dillon, Director of Sales and Marketing.

Corporate Computer Systems began producing programmer tools for the HP technical marketplace in 1978 with a full implementation of the C Language Compiler for the HP 1000. CCS will continue to develop custom systems for the HP 1000 and 3000 computer systems in addition to HP's new Spectrum Series.

FOCUS 4GL Available On HP Precision Architecture

Enables Programmers To Develop Applications On HP 3000s, 9000s

Hewlett-Packard and Information Builders Inc. (IBI) have announced the availability of FOCUS, IBI's fourth-generation language and database management system for HP Precision Architecture computers.

As an HP software supplier, IBI will sell and support FOCUS for use by programmers developing applications that run on the HP 3000 Series 900 and HP 9000 Models 300 and 800.

FOCUS will be available in two releases. The first release, FOCUS 5.0, is expected during the third quarter of 1988 on the HP 9000, and during the fourth quarter of 1988 on the HP 3000. Within six months, a second release is expected for each system, which will include an enhanced version of FOCUS including read interfaces to HP's ALLBASE database management system. ■

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In California call (415) 367-9696
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CIRCLE 131 ON READER CARD

NEW PRODUCTS

RS Series Software For HP 9000 Workstations

BBN Software Products Corporation has announced new versions of its RS/Explore and RS/Discover software for HP 9000 Series 300 engineering workstations under HP-UX. These software tools offer technical professional assistance conducting statistical analyses and designed experiments.

RS/Explore and RS/Discover software, part of BBN Software Products' RS Series, are options to the company's RS/1 system, the industry standard for data analysis software in R&D, engineering and manufacturing environments.

The menu-driven RS/Explore package serves as a statistical advisor, guiding users through a complete analysis and assisting them in understanding their data in less time and with less effort.

With its interactive environment, RS/Explore software provides a four-stage approach to data analysis: data organization, selection and application of statistical tests, and automatic written interpretation and graphical presentation of test results.

RS/Discover software allows technical professionals to plan, execute and analyze designed experiments that help realize the greatest information in the fewest experimental runs. Created especially for use in industrial research, development, engineering and manufacturing environments, the RS/Discover system is the first software package for the design of experiments that's fully integrated with data management, graphics and analysis tools.

The RS/Discover system allows users to define experimental conditions, select an appropriate design, enter collected data and perform an analysis and interpretation of experimental results.

RS/Explore and RS/Discover software ($4,000—$22,000) for HP-UX-based HP 9000 Series 300 computers is available immediately.

Contact BBN Software Products, 10 Fawcett St., Cambridge, MA 02238; (617) 873-5000.

Circle 400 on reader card

Carolian Systems Releases CALCI Version B.05

Carolian Systems International Inc. has released Version B.05 of CALC1, an interactive spreadsheet for the HP 3000.

Major enhancements have been introduced to the product's PRINT capability, allowing users to specify up to six different escape sequences for print control. This added functionality over report output is especially useful for sites that wish to redirect output to slave printers.

Other functions include an online tutorial and help facility, powerful consolidation capability, and the ability to exchange information between any spreadsheet on microcomputers and the 3000.

Contact Carolian Systems International Inc., 3397 American Dr., #5, Mississauga, Ontario L4V 1T8; (416) 673-7030.

Circle 396 on reader card

SCSI Products Offered For 9000 Series 300

Hewlett-Packard has introduced a small computer-systems interface (SCSI) and three new disc drives for the HP 9000 Series 300 technical workstation family. SCSI is an industry standard for connecting disc drives and other peripherals to host computers.

The new interface provides standard SCSI features, including support of up to eight devices on the bus, parity and bus arbitration. Support software implements the

BBN Software Products' RS Series data analysis software is now available on Hewlett-Packard's UNIX-based 9000 Series 300 workstations.

ANSI standard Common Command Set for Direct Access Devices. Devices other than magnetic discs aren't supported by this software.

The three new SCSI-compatible disc drives are the HP 7957S ($5,675), 7958S ($7,300) and 7959S ($9,350), which provide 107, 161 and 323 MB of storage, respectively.

The foundation of this disc product family is an HP-designed-and-manufactured 5¼-inch Winchester disc mechanism.

For customers interested in using third-party SCSI products, HP offers a complete set of open-system tools, useful for testing product connections or, if driver modifications are necessary, for solving any SCSI software incompatibilities. The HP-UX driver-source code, kernel debugger and support utilities are shipped with the HP-UX 6.0 programmers environment.
Call the Hewlett-Packard sales office listed in the white pages of your telephone directory.

Circle 398 on reader card

Codonics Introduces LP-6 Laser Printer

The new Codonics LP-6 Laser Printer is a personal-sized laser printer suited for graphics applications in the engineering and CAD/CAM environments and text printing for word processing. The printer has a compact design that allows it to fit comfortably on a desktop.

With three standard interfaces, the LP-6 has the ability to talk to almost any PC. With the standard HP LaserJet Series II emulation and a full megabyte of memory, the LP-6 is supported by all major software packages. In addition, the LP-6 is equipped with a complete HPGL 7475A Plotter emulation, which facilitates high-resolution, full-page, 300-dpi graphics hardcopy from any graphics software.

The LP-6 delivers full-page, high-resolution graphics and text at six pages per minute. Models LP-8 and LP-15 are also available at print capabilities of eight and 15 pages per minute, respectively. With 31 standard type fonts and optional cartridge fonts, the printers are flexible in document design. They accept several sizes and weights of paper and also print on transparency films and labels.

The Codonics LP-6 is a desktop-size laser printer suited for graphics applications in engineering and CAD/CAM environments.

The LP-6 duty cycle is rated at up to 5,000 pages per month with an expected life cycle of 180,000 pages.
Contact Codonics Inc., 18001 Englewood Dr., Middleburg Hts., OH 44130; (216) 243-1198.

Circle 384 on reader card

Kelly Expands XL/3000 RAMDISC Memory

Kelly Computer Systems has announced a new version of its XL/3000 RAMDISC for the HP 3000 that is expandable to 120 MB of RAMDISC memory.

The XL/3000 RAMDISC, designed around Kelly's plug-compatible 3000 memory boards, allows users to partition memory into two classes: MPE and XL/3000 RAMDISC. The user can start with as little as 2 MB of RAMDISC and expand to 120 MB as applications and file sizes increase.

Kelly also announced a first-of-its-kind trade-up program for purchasers of its "classic MPE" memory products. Users who plan to purchase or who have already purchased "classic MPE" memory from Kelly can later trade up those products to the XL/3000 RAMDISC while receiving a credit on their earlier purchase.

The 120-MB size accommodates larger file sizes and concurrently maintains the XL/3000 RAMDISC's high-performance characters, for example, up to 400 I/Os per second on Series 4X and 5X, and up to 1,000 I/Os per second on Series 6X and 70, device access times of 1 microsecond and overall system improvements of 20 percent to 30 percent.
Contact Kelly Computer Systems, 1101 San Antonio Rd., Mountain View, CA 94022; (415) 960-1010.

Circle 372 on reader card

Model 302CAB Provides 3 kVA UPS For HP 1000s

LorTec Power Systems Inc. recently announced the Model 302CAB 3 kVA online uninterruptible power system (UPS), providing clean, uninterrupted ac power for the HP 1000, IBM S/36 and DEC VAX minicomputers.

The Model 302CAB incorporates a reliable ferroresonant inverter in a compact single-phase unit suitable for office use.

As a standard feature, the LorTec 3 kVA ContinuAC UPS is equipped with a 100 percent solid-state output transfer switch. It provides no-break transfer capability in the event of an output overload or inverter failure.

The LorTech 3 kVA ContinuAC UPS provides status alarm indicators configured in a power flow diagram and a performance monitoring system that's equipped with digital metering. A touch-controlled meter function select panel enables you automatically to scan or manually monitor nine conditions: dc voltage, battery current, bypass frequency, inverter frequency, output voltage, output amps, output power, bypass voltage and inverter voltage.

Contact LorTec Power Systems Inc., 145 Keep Ct., Elyria, OH 44035; (800) 222-2600 Ext. 265.

Circle 395 on reader card

HP Announces TEMPEST CAD

HP has announced its HP TEMPEST DraftMaster I and II drafting plotters.

The plotters have an A4/A through A0/E media range and meet the TEMPEST industry's NACSIM 5100A standards. They're listed on the April 1, 1988, U.S. Government Preferred Products List.

The HP 7595A-T ($14,900) and 7596A-T ($16,900) are intended for customers who need excellent line quality in a CAD/CAM/CAE application and whose environment tests must meet the rigorous TEMPEST security standards of NACSIM 5100A.

Among potential customers are the U.S. Federal Government and its direct agencies, U.S. prime contractors and the governments and direct agencies of current NATO countries, Canada, Australia and New Zealand.

HP TEMPEST DraftMaster I and II plotters can be used with TEMPEST-host PCs and workstations to complete a TEMPEST-workstation configuration.

Both plotters come with a serial interface for RS-232C and RS-422A for longer-distance computer connections. In addition, the HP TEMPEST DraftMaster plotters have full eavesdrop capability. Special TEMPEST interface cables are available for use with various TEMPEST host computers and PCs.

HP TEMPEST DraftMaster plotters have a maximum pen speed of 60 cm/s (24 in./s), acceleration of up to 5.7 g and built-in intelligence features such as line quality, media and pen flexibility, pen and media handling, HP 7585B and HP 7586B software emulation and international symbols and languages.

Call the Hewlett-Packard sales office listed in the white pages of your telephone directory.

Circle 399 on reader card

HP Systems Utilize VAX-Compatible Software

Boston Business Computing Ltd., a developer of DEC-compatible software, is supporting the HP 9000 UNIX machines with two DEC-compatible software products — VCL, the VMS emulator which implements many popular commands in the Digital Command Language (DCL), and EDT+, an emulation of Digital's text editor, VAX EDT. Both packages are available on the HP 9000/300 and 9000/800 Series running HP-UX.

VCL features an extensive VMS command set of over 60 DCL commands such as ASSIGN, COPY, DELETE, DIFFERENCES, MAIL, SET DIRECTORY, and SPAWN; lexical functions; flow control of command files; line editing; command history and a customizable HELP facility. VCL's lexical functions give users access to system variables, conversion of data types and character string manipulation. VCL includes the VMS flow control commands used in command files. Users can create batch processes that run after hours and provide next-day results.

EDT+ implements all of the features in VAX EDT including GOLD Keys, an extended ASCII character set, user-defined keys, customizable HELP, multiple buffers, disaster recovery, macros and file transfer capabilities. The file transfer facility allows users to include files from the VAX while editing.

VCL and EDT+ (licensing is $495 on 9000/300, $1,995 on 9000/800) eliminate extensive UNIX training for VMS users. The VCL "TEACH" command helps VMS users learn UNIX by displaying the equivalent UNIX command of the VMS command entered. Also, VCL has a "PASSTHRU" mode that lets users access all UNIX and VMS commands and utilities.

Contact Boston Business Computing Ltd., Riverwalk Center, 360 Merrimack St., Lawrence, MA 01843; (617) 683-7920.

Circle 394 on reader card

DATA-TRACK Designed For Series 200/300

Applied Data Research Associates (ARA) recently released DATA-TRACK, a flexible data handling system suited for most typical research and technical applications.

The key feature of this system consists of its open architecture, which enables you to quickly set up various configurations from the standard DATA-TRACK segments, standard programs and custom developed segments.

The standard configuration is designed to fit most needs. Specialized applications can

Continued on page 82.

HP's new E-size TEMPEST CAD plotters meet NACSIM 5100A standards.

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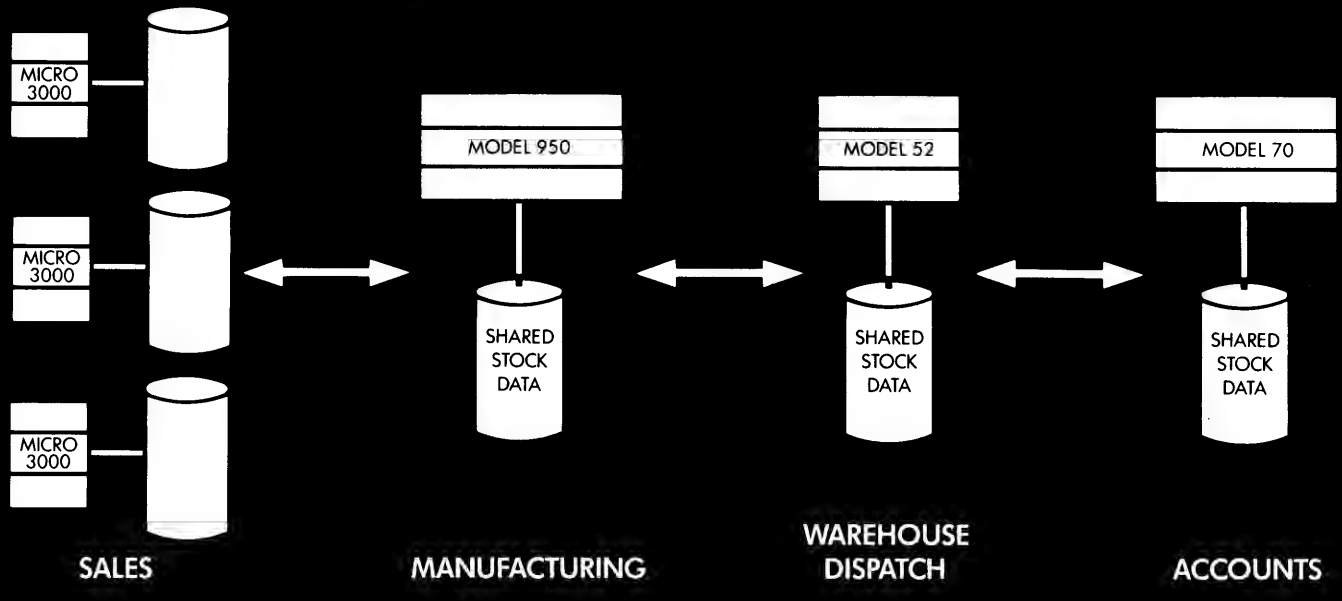

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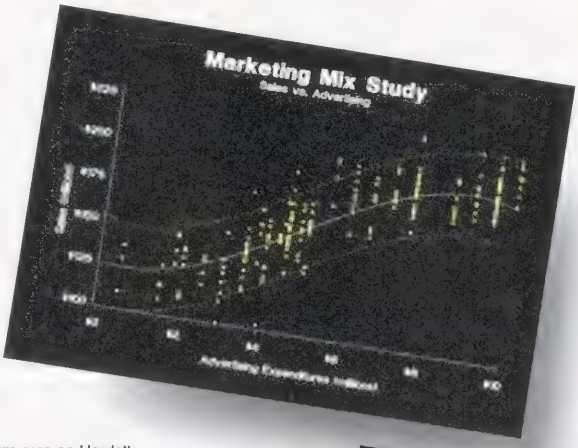

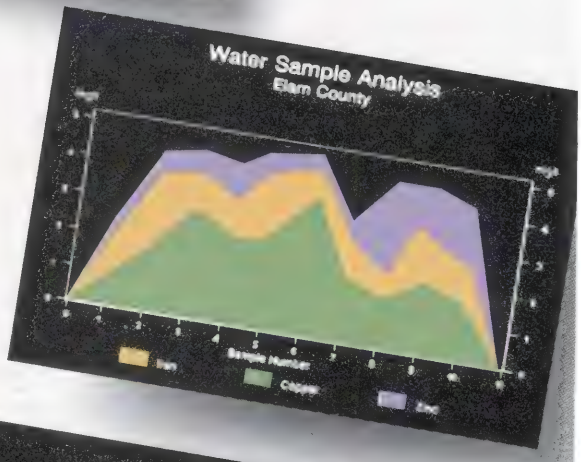

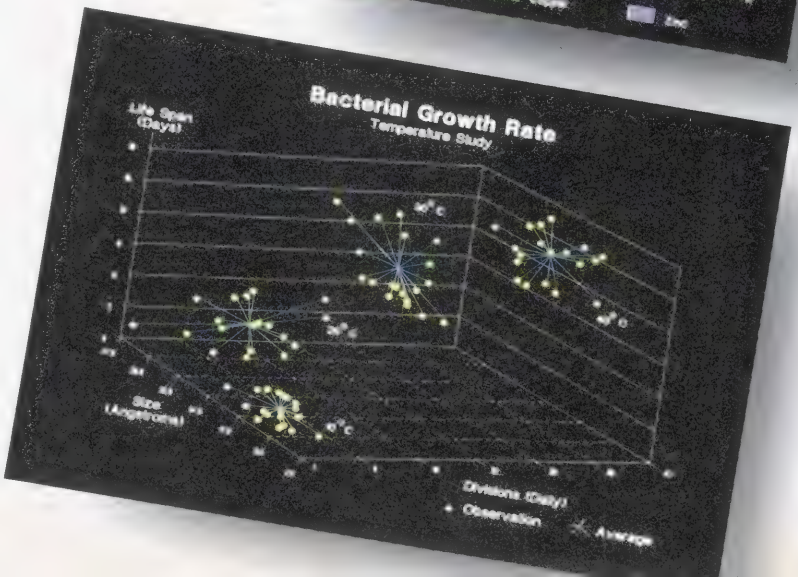

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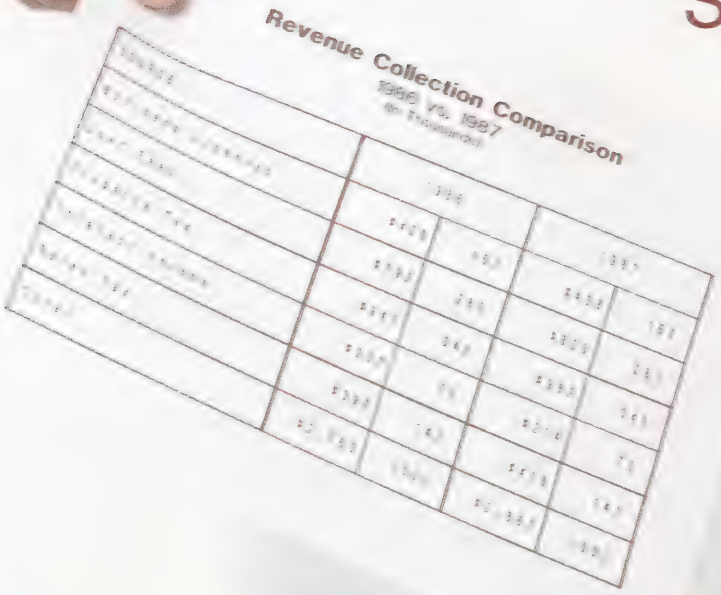

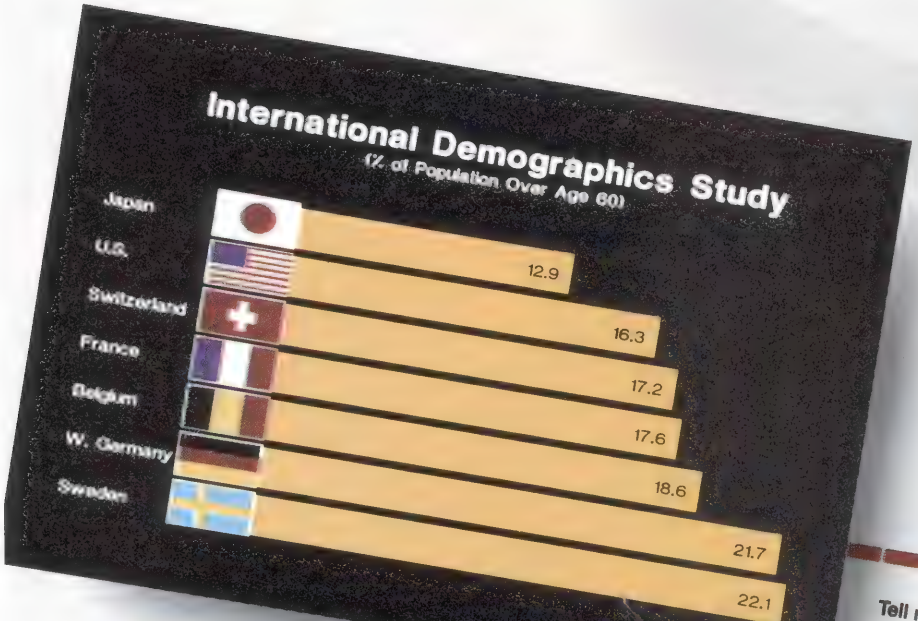

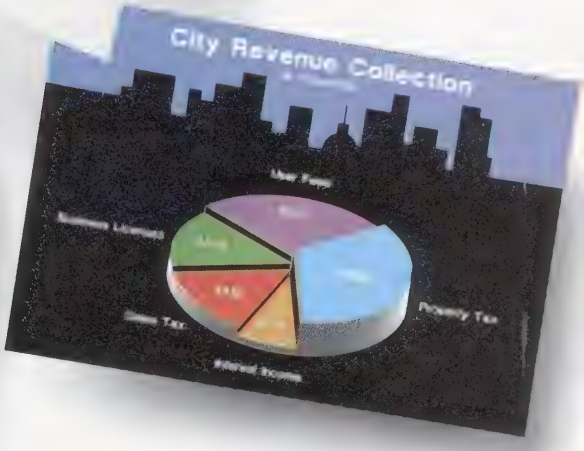

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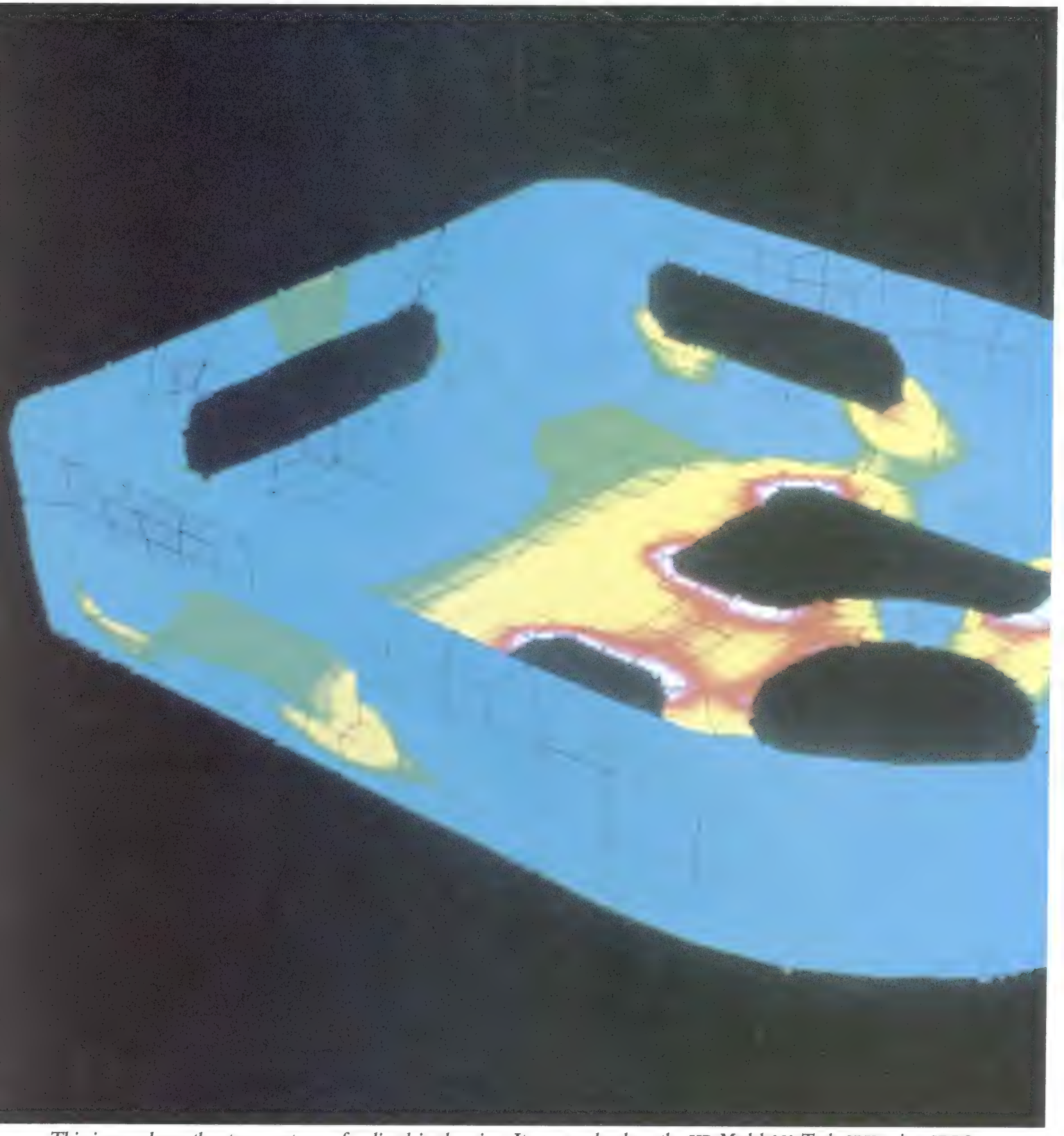


This image shows the stress contours of a disc drive housing. It was rendered on the HP Model 350 TurboSRX using SDRC Supertab. The areas in red indicate areas of high stress and could be potential problems.

As Workstations Like HP's TurboSRX Increase In Performance and Become Accessible To More Scientists And Engineers, More Scientific Breakthroughs Will Occur

Scientific Visualization

[BY ANDY BARLOW]

Scientific visualization is emerging as a major computer-based field. It allows scientists and engineers to rapidly interpret large amounts of data and understand problems by visualizing it. As workstations become more powerful, graphics performance increases and prices drop, more scientists and engineers will have access to this powerful field. Their productivity will increase and breakthroughs will be made.

The field of scientific visualization covers many disciplines. For scientists, it includes molecular modeling, medical imaging, brain structure and function, mathematics, geosciences, space exploration and astrophysics. For engineers, it can cover fields from computational fluid dynamics to finite element analysis.

By combining computational and graphics performance, scientific visualization transforms the symbolic into the geometric. Typically, scientific visualization works with large amounts of data that must be interpreted quickly. Since 50 per-

cent of our brain's neurons are related to sight and the bandwidth of the eye/brain system is large, visualizing it is critical to absorbing it in an efficient manner.

THE BENEFITS OF scientific visualization are tremendous. The most obvious is that it provides ways to see the unseen.

A chemist, for example, may wish to know how various chemical fragments taken from a database or protein structure will fit together to better understand the potential properties of a lifesaving drug. An astrophysicist may wish to test a theory by simulating the complex behavior of matter accreting into neutron stars, the birth of galaxies after the Big Bang, the seismology of our sun, or the formation of a planetary system.

All these examples require significant computational performance, as well as graphics performance to visualize, interpret and communicate the results.

Real world data also might come in the form of X-rays or MRI scans. An emerging application is the fitting of prostheses to individuals for orthopedic reconstructions, such as hip replacements.

The 3-D fit must be precisely individualized to minimize rejection. It is only by taking data and rendering it that accurate specifications can be obtained so hip replacement can be fabricated in advance of a surgical procedure. Scans such as these also are being used for preoperative surgery.

Scientific visualization allows images to be generated from complex data sets. The best example of this is finite element analysis, a technique to solve problems ranging from aircraft design to modeling the motion of the inner ear to the better design of tennis rackets.

Typically, the results of finite element analysis are large sets of data that represent the stress or strain at various points on a model. By taking this data and representing it as color contours, scientists and engineers gain insight to better designs.

Another example is the Non-Uniform Rational B-Spline (NURBS). NURBS has emerged as an important tool to represent complex geometric surfaces. NURBS are merely piecewise parametric equations used to represent models used in CAD; however, they more precisely and accurately define solids and surfaces than polygons and can do it with much less data. By themselves, NURBS are just sets of equations. When rendered, they provide and define the shape of the object.

Scientific visualization also allows scientists to better interpret real world data; data that was not the result of mathematical calculations done in software but actually exists. Photographs taken from orbital satellites, for instance, must be stored, manipulated and rendered in order to give geologists and meteorologists useful information. After processing, information such as cloud formation, vegetation growth, or urban development can be better understood.

Scientific visualization allows images to be generated from complex data sets. The best example of this is finite element analysis.

Finally, scientific visualization can enhance the creative process and provide new insights by allowing concepts and theories to be tested quickly. The ability of a scientist to visualize complex computations and simulations is absolutely essential to ensure the integrity of the analyses, to provoke insights and to communicate those insights to others.

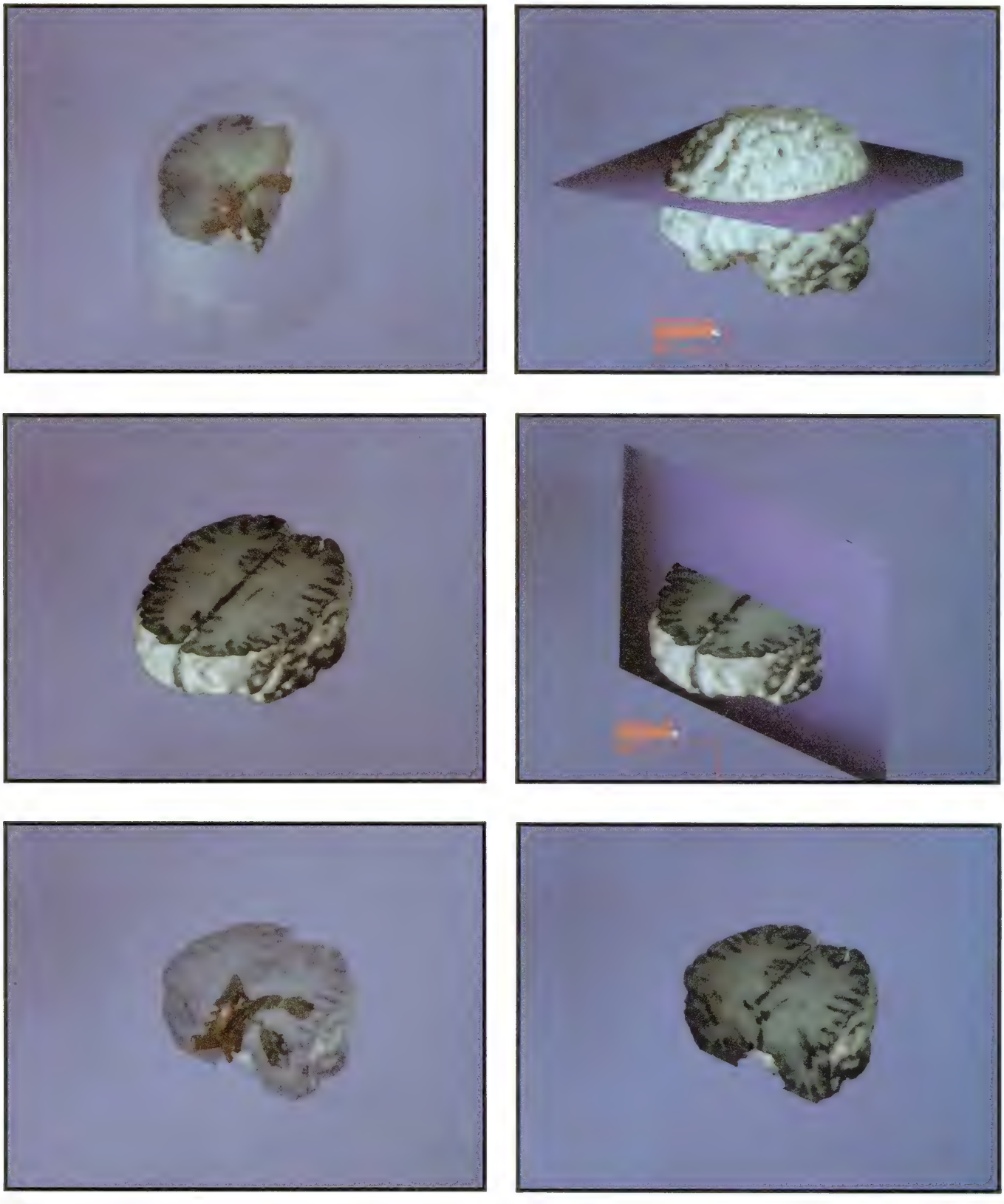
For example, one astrophysicist found an erroneous boundary condition in his code after examining an image of a jet stream with an obvious reflection not apparent in the numbers.

UNTIL RECENTLY, most scientific computing and visualization has been restricted to supercomputers; however, three important trends have led to the growth in scientific visualization for workstations. Besides, significant drops in prices for all computers, rapid increases in computational performance, connectivity with other computers and increases in graphics processing power are providing tools to a larger audience.

Each month, workstation vendors are making breakthroughs in computational performance. Currently, Hewlett-Packard offers 14 MIPS on its RISC-based workstation (the Model 9000 Series 835). Sun Microsystems has promised to double performance every year, DEC expects to offer 35 MIPS by 1990 and IBM claims 20-25 MIPS will be on the RT by 1992.

The performance improvements are important, because most scientific calculations require a high degree of accuracy. A survey conducted at HP indicates that by 1990, customers will expect at least 16 Mflops in floating point performance and 40-80 MIPS in integer performance.

The ability to visualize the results and guide the calculations themselves requires substantial graphics performance. In general, workstations tend to be more powerful and effective visualization tools than supercomputers since specialized graphics processors are more cost effective than supercomputers for image processing and generation. Today, it's not unusual to find performance of 250,000 to 400,000 3-D vectors per second. HP, for example, recently introduced the Turbo-



This sequence of images shows how HP's graphics computers visually can "take apart a brain" to look for problems. The first image shows the location of the brain in the skull. The remaining images show various slices through the brain.

SRX, with extensive hardware lighting models for photorealistic image generation and primitives for interactive solid model rendering.

To obtain this performance, many vendors have not only increased the power of their graphics processors, but also have implemented them in parallel. Specialized chips are being built to speed up certain aspects of rendering, such as hidden line and surface removal, lighting models and primitives. Finally, software graphics libraries are improving to take advantage of the new processors.

Animation can become another important aspect of the graphics processing. Satellite images, for instance, stored in main memory, often must be sequenced for accurate weather forecasting.

ALTHOUGH THE GRAPHICS PROCESSORS are closely coupled to the CPU, connectivity with other computers will be the glue that will prevent this field from becoming just islands of productivity. Not every scientist or engineer can afford to buy a Cray or some other supercomputer. There always will be times when the problem will be large enough that it doesn't make sense to perform it on a workstation. Therefore, the ability to connect with larger computers and to store large amounts of data is critical.

Recently, two vendors have begun to address this need: Ardent and Stellar. They offer products that Dataquest calls graphics supercomputers. Although they offer high computational and graphics performance, they cannot be considered workstations.

Scientific visualization is clearly emerging as an important field for workstations that will cover many disciplines. Workstation vendors who can provide the computational and graphics performance, the tools to connect to any computer, and rapid communication on that network; vendors who drive and adhere to standards, and can provide assistance to ensure that it all works together, may provide the most cost effective solution for today's scientists and engineers.

As workstations increase in performance and become accessible to more scientists and engineers, breakthroughs in science can be expected. *—Andy Barlow is graphics product marketing engineer, Hewlett-Packard, Ft. Collins, CO.*

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HP has the new TurboSRX, available on the 68000-based architecture Series 300 Model 350 and on the Precision Architecture-based Series 800 Model 835. Both use HP-UX, the HP version of UNIX System V. (See "The New 350/835 TurboSRX," by Andy Barlow, *HP PROFESSIONAL*, April 1988, p. 46.)

Apollo Computer has a good reputation in the superworkstation market. Sitting at the top of the Apollo line is the DN590 Turbo announced in May 1987. Based upon the Motorola 68020 microprocessor, it's fully supported by Apollo's Domain network. The Domain network concept emphasizes the desirability of working with a single copy of all data that is available throughout the network.

The operating system is a UNIX 4.2 base with System V extensions, and it uses a kernel common with the Apollo proprietary Aegis operating system. Image processing, mechanical design and molecular modeling are primary targets.

[By Dr. Michael M. Dediu]

Silicon Graphics Inc.'s (SGI) latest product announcement was in November with the Graphics Turbo (GT) upgrades for its 4D/60 and 4D/70 workstations. Its goal is to increase the rendering capability of its systems while maintaining a performance level adequate to display objects with smooth motion.

Toward that end, SGI included in the GT a technique called alpha blending, whereby an additional eight bits per pixel carry an alpha value or coverage information useful for video compositing and creating transparency.

Silicon Graphics uses the RISC processor from MIPS Computer Systems and supports both the 8-MHz, 7-MIPS and 12.5-MHz, 10-MIPS chips. The GT is built on an extensible architecture. It's capable of faster operation through clock speedup.

Sun Microsystems' CXP comes on two platforms: the 68020-based 3/260 rated at 4 MIPS and the new proprietary SPARC (RISC)-based 4/260 rated at 10 MIPS.

The CXP is oriented toward solids modeling and finite-element analysis, but it doesn't support extensive lighting features in hardware.

Sun has the TAAC-1 applications accelerator. This special hardware is designed to

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provide mathematical and image-processing capability through an integrated array processor and full-color frame processing buffer, both programmable. For applications, including image processing where the programmer is willing to customize the application and write machine-level instructions using the TAAC-1 C compiler, there is a lot of raw power available. This is a new approach in the superworkstation market and may signal a trend toward more application specialization in superworkstations of the future.

Tektronix's new 4300 Series superworkstations have dual 32-bit engines, which can divide computing and graphics processing tasks. They are based on the 68020 Graphics Processor, parallel pipelined architecture and five custom gate arrays.

Prime Computer has an engineering and scientific superworkstation — the PXCL 5500 with 16.7 million colors, 145,000 3-D floating point transformations per second, 10-MIPS CPU engine, 16 MB of main memory, RISC technology and Ethernet-TCP/IP communications.

DEC's superworkstation is the VAX 3200 with 4 MIPS and 0.5 MFLOPS. Gould/DeAnza superworkstations also are interesting in this growing market.

The workstation market is about $1.2 billion/year, with Sun Microsystems and Apollo Computer each having about one third of it. DEC has close to 10 percent and HP has some nine percent market share.

OVER THE NEXT EIGHT to 10 years, image processing and mapping using satellite data probably will approach a market value of $8 billion.

An image-processing superworkstation can extract information from the multispectral data collected by an aircraft or a satellite (like Landsat Thematic Mapper) through differences in spectral values. It analyzes the data in each band, determines clusters of like intensities, then groups values into classes.

The analyst can add pseudocolor to display more classes more clearly — weed pasture, for example, might be shown as red, improved pasture as blue. To find out what cover type each cluster of values represents, the analyst relies on aerial photography and ground observation. In creating these maps, an engineering group eventually develops a large database, which can be used again in different projects.

A superworkstation also can be programmed to look efficiently for specific cover types. These superworkstation classifications produce very accurate maps and reduce the expense of ground surveys. The distinction between soil, rock and vegetation, which can be revealed by different spectral signatures, is particularly significant in the analysis for hazardous waste projects, for example. A map may show chlorotic yellowing (a decrease in the chlorophyl content of plants) or an abrupt change in vegetation. All these changes can be pinpointed from the data's differing spectral signatures.

Image processing also can lend a hand in hydrogeologic modeling to quantify land-use factors that only could've been estimated in the past. There already are models that use satellite-derived data and image processing technology, such as a watershed model for Dallas and Plano in the White Rock Creek watershed management project. This model will be used to project the future size of the flooding problem and make decisions affecting city development, flood insurance and pipe construction.

Three-dimensional visual simulation and satellite image processing have successful applications in weather prediction. Row satellite data can be misinterpreted; for instance, snow and sand are very similar to clouds. Superworkstations interpolate the satellite data with known facts and surface reports. The simulation programs automatically cull extraneous factors, such as lighting angles and shadows, by making all clouds appear as if the sun is overhead. The model forecasts cloud cover by taking into account wind speeds and directions, relative humidity and cloud-top temperatures at six-hour intervals. Powerful algorithms are used in simulations and modeling.

Modeling The Memory

THE MEMORY SUBSYSTEM of conventional processors often is one of the performance bottlenecks of the computer because it determines the rate that the CPU may access data and instructions. Therefore, tradeoffs between memory subsystem performance and computer cost are of particular interest to designers. The modeling is most useful during initial phases of computer development. The memory subsystem of a processor impacts performance principally by limiting the rate at which the CPU may access data and instructions.

It's important to estimate the sensitivity of a processor's performance to memory subsystem effects, specifically to variations in cache and translation buffer (TB) design. The sensitivities are derived from comparisons of processor performance estimates for processors with varying memory subsystem designs. They may be used as a tool to help evaluate tradeoffs between processor performance and memory subsystem costs in the initial phases of a processor implementation. Estimates of processor performance will indicate whether or not a design choice is reasonable, shortly after the implementation is suggested.

Also, during development, some components other than the cache/TB may not be fully specified. Once the processor performance is estimated, sensitivities of the computer to memory subsystem design may be investigated.

Both components of the processor, the CPU pipeline and the memory subsystem, may experience waits. These waits cause a loss of performance from the optimum performance. For superworkstations, it's important to minimize the degradation to performance; therefore, waits are of concern. The waits

that the CPU sees are caused by branching, data dependencies and bus contention. The cache/TB waits are caused by misses, and may be extended by bus contention.

The CPU is assumed to be a pipeline. As such, it exhibits an interlocking behavior characteristic of pipelines in the event of conditional branches.

A second problem caused by the pipeline is that of data dependency. A stage of the pipe may have to wait for valid data, if a stage further along in the pipe is in the process of producing it.

One further CPU wait that is not due to the pipeline nature of the CPU is a write stall. A write stall is caused when a previous write is on the bus and there's no place for the CPU to put new write information. The CPU must hold the write until a place is available to buffer it.

> Over the next eight to 10 years, image processing and mapping using satellite data probably will approach a market value of $8 billion.

Cache/TB waits are caused by access to non-resident data (i.e., misses). A cache miss causes the processor to wait for the data to arrive from main memory. This wait is called a read stall. A TB miss causes the processor to wait for a valid translation of the virtual address. If, in the process of translating a virtual address, a cache miss occurs on the page table entry for that virtual address, then the processor encounters an additional read stall.

The lengths of both the cache and the TB wait times are defined to be the average service times required to refill the cache or TB on a miss.

A design of a superworkstation that has fewer waits is generally a more efficient design. However, the highest performance design may not be the best design. Other issues such as cost, reliability and modularity may decide the best design. A performance study is needed to determine the effect of processor organization on waits. The study should produce marginal performance improvements across the implementations of interest.

Processor Performance Analysis

PERFORMANCE, IN ITS BROADEST definition, is an amount of useful work done for some unit associated with cost. In the fields of processor performance, computation is the measure of useful work and time is the cost unit.

MIPS is a simple and commonly used performance measure. However, by using instructions to measure computation, it lacks robustness, because different architectures may do different amounts of work per instruction. In addition, specific workloads within a particular architecture also may do different amounts of work per instruction. The instruction mix of one workload may stress more of the simple instructions of the architecture, while the instruction mix of another workload may emphasize more complex instructions. Nevertheless, MIPS is generally used for performance analysis.

Both technology and organization influence the MIPS rate of a machine. Technology is a self-driving force. It is a given in system design that should be used by the manufacturers of the superworkstations.

MIPS may be partitioned into two more fundamental units: cycle time (CT) with units with a microseconds per machine cycle, and cycles per instruction (CPI), where MIPS equals 1/(CT*CPI). In a first order approximation, cycle time embodies technological effects, while CPI embodies only organizational effects. For example, if the technology change has a major impact on the critical path length of one component but not another, then the apparent CPI attributed to each component changes. Hence, technology has influenced relative organizational effects.

A good performance study produces both absolute performance and, more important, sensitivities. The sensitivities are used by a design team to create the most efficient superworkstation of a given architecture within constraints like cost or space.

Trace-driven simulation is used to generate the number of misses per instruction for the proposed cache/TB design. A simulator models the major components of the processor. It is run by traces of programs measured in the field on an architecturally identical machine.

Because of its flexibility (no solder or etchings), it is used as a vehicle to compare perturbations to a processor's organization. Usually the absolute processor performance for each organization is estimated. Comparisons of the absolute performances suggest which of the organizations is most worthwhile.

A cache simulator usually is developed to be as general as possible. By treating caches as data objects, the routines provided for generic caches act as basic building blocks. The user then is able easily to tailor a simulated memory subsystem composed of caches to the system in question.

TBs can be handled by the same routines, since a cache with blocks the same size as the memory management pages (for example, 512 bytes for the VAX architecture) exhibits the same miss behavior as a TB with the same tag matching organization.

The cache simulator is composed of two parts: a shell that

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determines access behavior, and a set of generic cache manipulation and tag matching routines. The simulator may model virtual caches, hierarchical TBs and caches, and multisection TBs and caches.

For example, it can create caches that are subsets of larger caches or TBs that are subsets of larger TBs. It can create caches and TBs that are dedicated to specific types of references; e.g., instruction, data, process space, and systems space references.

The referencing pattern first may go through address translation and then access the cache, or it may do both in parallel. The actual organization and accessing behavior of the memory subsystem is determined entirely by the shell.

This method estimates the impact of the memory subsystem, specifically the cache and TB, on processor performance. It involves both trace-driven simulation to estimate the cache/TB miss rate, and simple analytic modeling parameterized with hardware measurement to estimate processor performance.

Trace-driven simulation takes as input a description of the cache/TB organization. It produces a miss rate, miss per instruction. The analytic modeling presupposes knowledge of the performance of the processor components other than the cache/TB; i.e., the performance of the CPU pipeline.

As input, it needs a base cycles per instruction that tells how often instructions complete through the CPU pipeline, and it needs the miss rate output of the appropriate cache/TB organization simulation along with the number of cycles required to service a miss. The processor's performance is then computed.

A cache/TB sensitivity analysis is possible as a result of using this method by varying the design of the cache/TB while holding the performance of the CPU pipeline constant. The resultant processor performances may be compared to yield the cache/TB impact.

The comparison may be used to put performance/cost tradeoffs in perspective. It shows the marginal worth of any enhancements to the cache/TB organization. A technique similar to the one presented here is useful during an early phase of processor design. The results give a good indication of how worthwhile enhancements to the memory subsystem are.

The study will be more complete if different workload types are available. Also, information on the masking of cache refills and address translations would make the results more realistic.

If parallelism is particularly well-fitted to any subject, it is to image processing. The question is when to parallelize with one structure and when to parallelize with another.

To answer this question is difficult because many highly parallel structures have been studied for and involved in image processing. In order to make it easier to get such an answer, it's useful to give some limits for major types of architectures, especially the more general one; i.e., multiple CPUs.

> Many different architectures have been suggested in image processing in order to increase the computation efficiency. . . four representative samples are the most important . . .

The total processing time may be improved by considering an efficient interconnection network in order to minimize the transfer delays. There is a limitation for the number of processors and memory banks due to the complexity of the interconnection network, which increases as the square of this number.

In order to evaluate the performance of a given program for image processing on a given superworkstation, a number of preliminary questions must be answered. For instance, how well matched is the chosen superworkstation architecture for a specific computational task, and how can a system be selected as "more suitable" for image processing problems? Is there a means to decide which is the best algorithm for achieving the solution to an image processing task?

In order to answer these questions, we need to consider some of the existing classes of machines, both operative and recently built, and to analyze them.

Important Architectures

MANY DIFFERENT ARCHITECTURES have been suggested in image processing in order to increase the computational efficiency. From the wide class of newly studied architectures, a subset of four representative samples are the most important:

- *The sequential machine (Von Newman architecture)*
- *The array machine (SIMD architecture)*
- *The pipeline machine*
- *The paracomputer*

The first one represents the historical starting point of a general-purpose computing system used for images. It must be considered since it constitutes the class of machines most widely used in this field.

Array processors, which contain a set of processors executing the same instruction, driven by a host computer, belong to the SIDM class and are the most suited (in terms of data structure matching) to image processing tasks.

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The pipeline machine, largely used in scientific computation together with a host computer, easily (and quickly) can compute neighborhood operators "on the fly" as pixels are read in the different operating units of the system.

Finally, the paracomputer, a concept used in other performance evaluation work, allows the consideration of an ideal machine which can read in common memory simultaneously from different processors and vice versa. A single cell may be written in by a number of different processors and the resulting stored information in the cell may be either a random one from the set or some specific one having an attribute (maximum, minimum, etc.). In other words, no memory contention problems exist in the paracomputer, and the number of processors is unlimited, coinciding, in our case, with the number of pixels. This computer model is useful as a limit case to be considered in the most optimistic light.

Other classes of architecture have been studied and sometimes suggested for image processing and pattern recognition applications: the MIMD machines, multiSIMD, reconfigurable arrays, etc. So far, they don't appear to be particularly suitable for the efficient implementation of image processing algorithms. Moreover, special-purpose hardware functions (systolic, TOSPICS, etc.) have been implemented for specific tasks, but they usually constitute units embedded in large processing systems and cannot be considered as autonomous classes of architectures.

Different important factors must be introduced in the overall evaluation, such as overhead time, communication time and input-output time, etc., so as to have a more detailed description of the computation process and enable an extrapolation to the ultimate speed-up gain that can be achieved by a given class of machines.

Another important factor is the number of elementary operations (arithmetical, memory transfers and loading) for a class of machines necessary to execute the algorithm.

HP and other manufacturers have made major investments in superworkstations and proprietary technology; therefore, in the future, we will see superworkstations with much better performance and functionality. *—Dr. Michael M. Dediu is president of Dediu Computer Consultants, Tewksbury, MA.*

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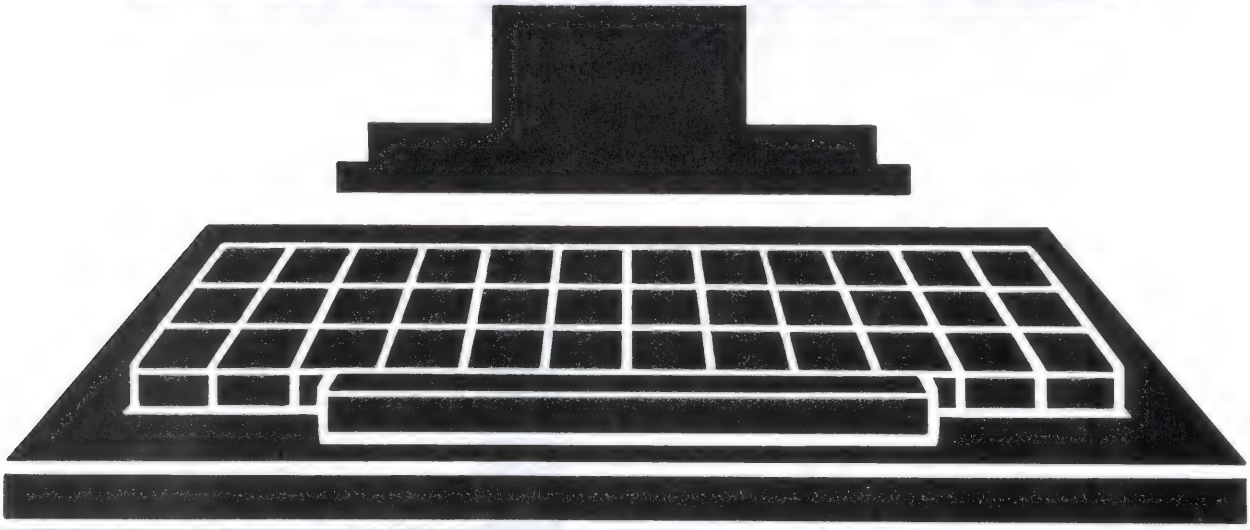

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The Impact Of Workstations On Electronic Publishing

Bringing Publishing Into The CORPORATE MAINSTREAM

[By Jeff Tai]

It's been five years now since a new generation of electronic publishing systems designed for corporate publishing made their debut — all the systems in the initial group on proprietary hardware. In this short time, electronic publishing has been totally transplanted from that proprietary base and firmly rooted in the world of standard workstations. Everyone but the most die-hard vendors and users has embraced standard platforms, acknowledging that generic workstations have the power to run even the most high-quality professional publishing functions.

This migration to standard platforms has brought many benefits for publishing system users. Among them are compatibility with other applications and greater flexibility to configure systems with input and output devices of choice. Yet, we may have seen only the beginning of the impact that the workstation platform eventually will have on publishing.

Today's publishing tools inevitably reflect the assumptions and conditions of

several years ago. In 1983, a handful of intrepid vendors introduced publishing systems designed not for professional typographers, but for corporate users.

This was something new, and yet it wasn't. These systems were targeted for dedicated in-house publishing departments, whose needs are similar in many respects to commercial publishers. The corporate context was addressed mainly through easier user interfaces and through the ability to receive input from word processors and CAD/CAM systems.

As part of the mainstream of corporate information flow, publishing will be subject to influence from corporate computing strategies and managerial priorities.

While these systems automated publishing tasks, bringing greater efficiency, they did not depart from traditional assumptions about graphic arts processes and workflow. In general, the tools we have today still reflect those same assumptions.

THE TOOLS WE USE TOMORROW are likely to be based on a very different set of assumptions. Workstations are not only putting electronic publishing in the hands of the corporate publishing staff, but, at least potentially, in the hands of a broader range of new corporate users as well. The publishing tools of today are available to engineers, marketing and customer service managers, financial analysts, administrative support staff — people whose major responsibility is certainly not publishing, but who nevertheless must publish information critical to the corporation as a part of their work.

The problem is that today's tools don't necessarily fit the needs of such users. Not only do these new users have needs that are quite different from those of the dedicated publishing staff, but they often have applications that most publishing system developers have never even considered. Tomorrow's tools will be designed to serve this broader range of needs and applications.

As standard platforms gradually bring publishing into the daily worklife of the entire corporation, publishing tools also will begin to be shaped by nonpublishing issues and priorities. As part of the mainstream of corporate information flow, publishing will be subject to influence from corporate computing strategies and managerial priorities. Tomorrow's publishing tools, in fact, will be part of broader publishing solutions that make sense from a corporate point of view and serve corporate objectives.

As an exploration of the changes I expect to see in electronic publishing as it enters the mainstream corporate environment, I'll focus on customization and integration. We at Omnipage Corp. (Pittsford, NY), a manufacturer of electronic publishing software for UNIX systems, believe they'll become distinguishing features of a new generation of corporate electronic publishing solutions. We believe that a new generation of users will demand them.

This is very exciting — and very challenging for vendors. It is at this point — when the technology begins to permeate our daily work lives and get into the hands of a broad, diverse mix of users, and as these users begin to apply it not only to doing familiar things better, but to doing new things in entirely new ways — that the true "electronic publishing revolution" begins.

We're just at the brink of this revolution, which we can see by comparing where we were five years ago with where we are today.

Five years ago, thinking about publishing as part of product development was a novel idea. Many corporations were shocked to discover that while they had automated product design and manufacturing, they were still producing product documentation with inefficient, time-consuming manual methods. They were even more shocked to discover what that was costing them, in money and in delayed product ship dates.

Today, it's generally accepted that publications are part of the product and that they must be developed in parallel using the most efficient methods possible. But the fact is that publishing is much more than a parallel activity — it is intimately entwined with all aspects of product development. To develop more productive publishing tools, we need to begin to think of publishing as an integrated part of a much larger process.

AT EVERY STAGE of product development, internal documentation must be generated, circulated, reviewed and revised before it can be signed-off on and the next stage of the project begun. In fact, statistics show that the average engineer spends 20 to 35 percent of his time devoted to such nondesign functions. The efficiency with which this information is generated can have a substantial impact on the productivity of engineering work groups — the core of product innovation and excellence.

It is not just engineering productivity that's affected, however, but other areas of the corporation as well. Almost every department, in fact, in some way uses information generated during the design cycle.

> What is needed is a publishing solution that can provide tools specifically designed for engineering applications . . .

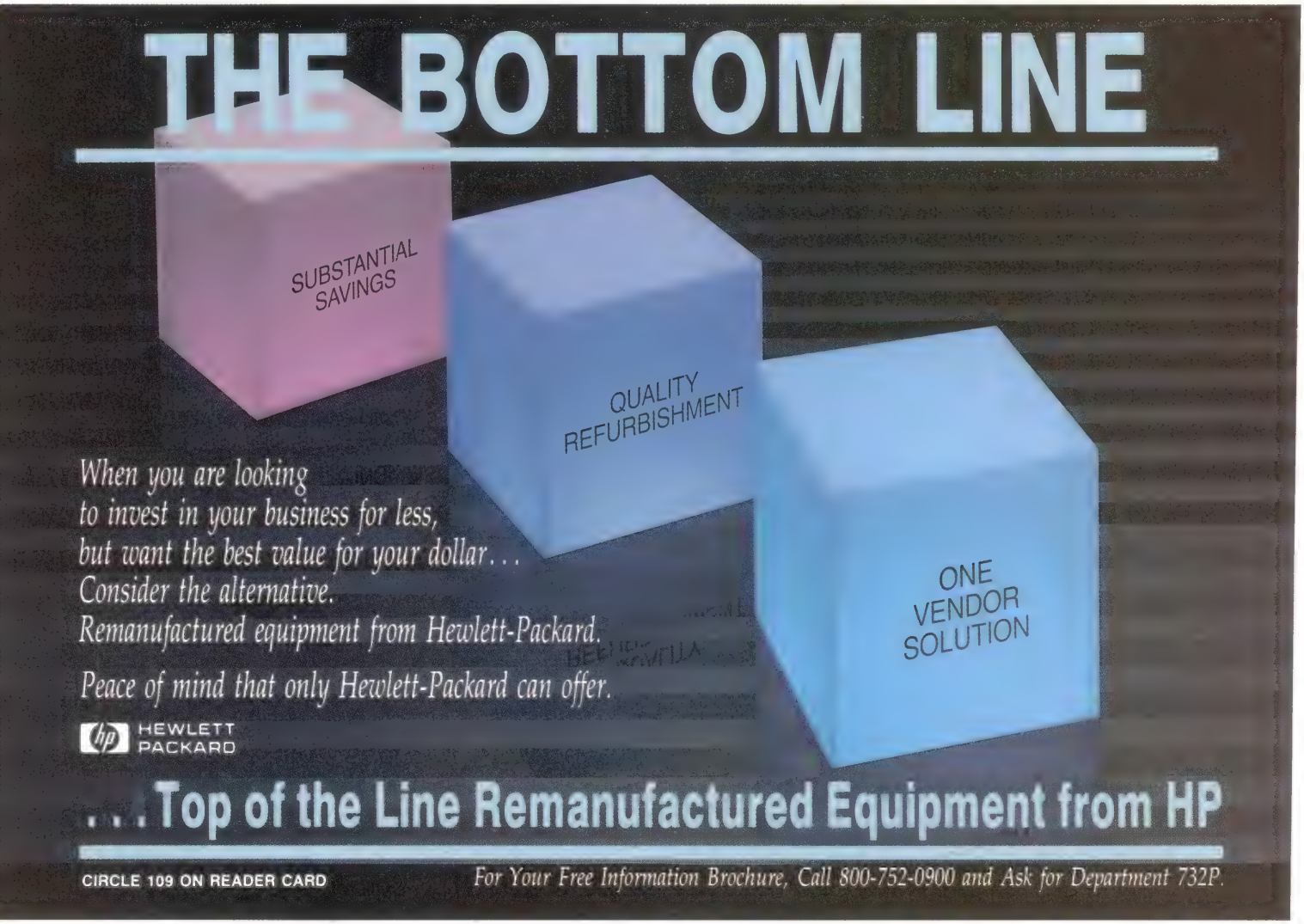
Electronic publishing has the potential to contribute to successful product development in the same way as electronic mail or electronic conferencing. The greater potential of electronic publishing is not only to increase the efficiency with which external publications such as user manuals are produced, but also all of the documents that are published internally in the process of bringing products to market (and the extent to which they can be cannibalized and used in various ways to accelerate the production of external publications).

The problem is that, unlike electronic mail or conferencing, which may be designed specifically for engineering applications, publishing tools generally are not. In most cases, the engineering staff ends up using the same publishing tools being used by the dedicated publishing staff. In engineering, these systems may be inefficient; they may not be fully compatible with engineering applications; their features may be too sophisticated; they may force users to employ workflow and terminology that are alien.

What is needed is a publishing solution that can provide tools specifically designed for engineering applications and ways of working — and, similarly, tools specifically designed for marketing, finance, customer support and any other department producing publications.

It goes without saying, I think, that such a publishing solution must not only be available on standard platforms, but support standard operating systems, windowing environments and data formats. In addition, however, solutions should provide fast, convenient access to just those features needed by individual departments and work groups for the specific types of documents they create.

Publishing tools should display familiar terminology in



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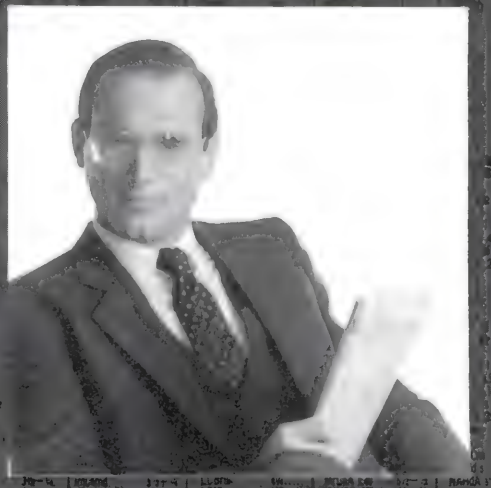

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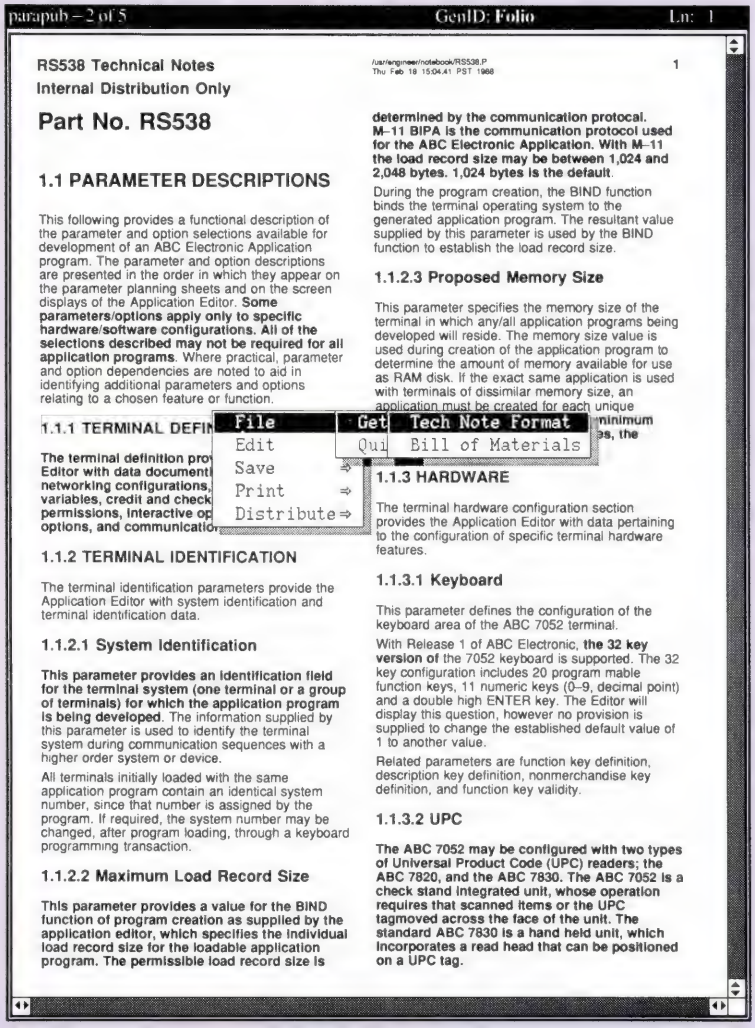
menus and help messages. They should include features that make it easy to move between publishing software and other software applications.

In engineering, for example, it should be easy when you update a CAD drawing to find out exactly what publications contain that drawing and thus require updating as well. Similarly, there should be time-saving features that automate formatting, distribution and updating of specifications, project plans, technical notes, bills of material and other frequently published documents.

Is this a wish list or a prescription for a flurry of niche publishing products? Neither. It's a prediction that we will begin to move toward more flexible publishing systems, systems that can be custom-tailored to really fit users and their needs.



Menus customized for an engineering work group (above) and a documentation group (right). Menus, help messages, keyboard layouts and system operations in* OMNIPAGE, *electronic publishing software for systems running UNIX, can be custom-tailored to work differently for each group of users. This is essential if electronic publishing is to serve mainstream corporate computing and information management needs.

FIVE YEARS AGO, it was quite a feat just to be able to integrate text and graphics on a page. Publishing system vendors didn't look much beyond the composition and pagination tasks. If we want to have more productive publishing tools, we'll need to look up from the task to the process it serves.

In the computing industry as a whole, the trend is away from task automation. Manycompanies have found that, although computers have brought greater efficiency to particular tasks, incompatibility between systems in different parts of the organization is now impeding the communication and coordination required to be competitive in fast-paced industries. The move is toward integration of tasks and overall optimization of the entire product development process. As part of the corporate mainstream, publishing must move in this direction as well.

Electronic publishing, in fact, can be a major means of integration, or a major bottleneck. When everyone is using different publishing tools, the information flow stops and starts. Someone wants to use a document produced by another group as a basis for a document he needs to produce, but the systems aren't compatible, so he ends up going back to an ASCII text file. Where he could use a great deal of the document as it is, he ends up starting from scratch. Or maybe he would like to use a drawing published in a document, a drawing that has been edited from the original design drawing and has been signed-off on for presentation purposes.

Because the systems aren't compatible, he has to go back to the source drawing and re-edit. Then, of course, there may be the necessity of checking the drawings to make sure the edits match.

The need, we believe, is not only for different publishing tools for different users, but for different tools that are integratable across work groups and departments. All of the publishing tools being used by internal-document generators also must be integrated with the more sophisticated tools being used by dedicated publishing departments. In this way, dedicated publishing departments can provide internal-

document generators with additional services and backup, as well as make use of information in internal documents for external documents.

Thus, individualized publishing tools need to be subsets of an overall corporate publishing solution. Through the integrated publishing solution, as through integrated electronic mail and conferencing, we can achieve a universal channel for rapid, timely, efficient distribution of critical information.

Five years ago, we talked about the problems of documents changing. We designed systems that could make rapid revisions to text and graphics, systems that dramatically reduced the cost of making the multiple rounds of changes that are so common in corporate publishing.

Today, we need to think more about changing publishing needs. Responding to change is a major concern, of course, in other areas of corporate computing. Adaptability, flexibility and growth path are key aspects of many corporate computing strategies. Publishing, as it takes its place in mainstream corporate computing, must answer these concerns as well.

It's very difficult to tell what electronic publishing needs will be as this technology moves into new areas of the corporation. Electronic publishing is a rapidly advancing technology. The only thing that's predictable is that there will be new developments ahead. Users today must concern themselves with the ability of their chosen system to meet their changing needs and to incorporate new technological developments.

Adhering to standards is, of course, one very obvious way that vendors can ensure greater flexibility and adaptability. Again, however, I believe it is the combination of standardization and customization that will provide the most potent solution. What's needed is a true guaranteed growth path: the knowledge that you will never be dependent on what the manufacturer thinks you need; that you can change your system at any time to provide exactly what you think you need.

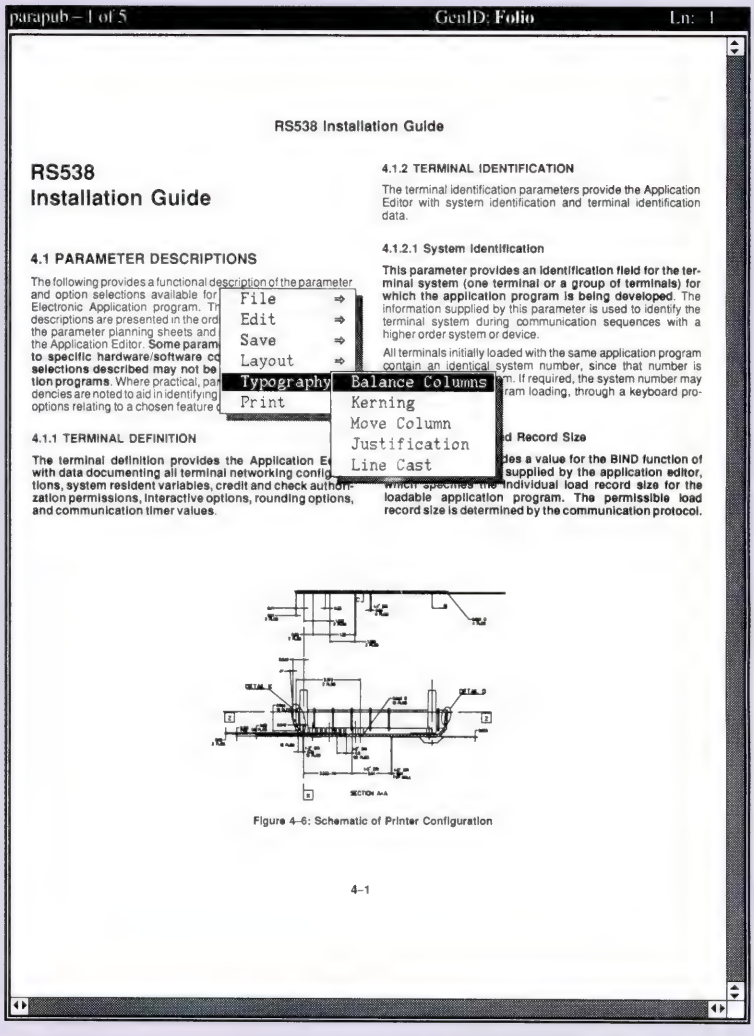


Figure 4-6: Schematic of Printer Configuration

Electronic publishing has entered the corporation through in-house publishing departments and hasn't yet moved very far out of this enclave. To make a greater contribution to productivity, electronic publishing must provide a broader set of solutions that can encompass the needs of all departments and work groups, as well as be more responsive to overall corporate computing strategies.

The challenges for mainstream electronic publishing are similar to those being addressed in every other area of corporate computing. In a sense, they come down to serving the seemingly opposite needs for greater autonomy and control. On one hand, we need systems that will give work groups and departments the tools they need to be more productive and innovative. On the other hand, we need systems that will help us achieve closer integration and better management of complex projects and processes.

Standard platforms have given electronic publishing the potential to deliver effective solutions in both respects. The combination of standard platforms and open architecture with flexible, customizable software is the next step.

—Jeff Tai is president and chief operating officer at Omnipage Corporation, Pittsford, NY.

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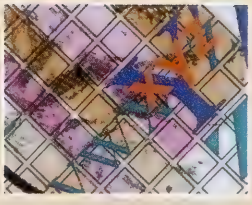

SOFTWARE

Doug Knapman

Attending a vendor show is always more enjoyable when your company has an immediate need. In our case, the need was to share printers between PCs and the vendor show was Interex's Las Vegas conference.

More specifically, we needed to share a LaserJet Series II among our word processing users and to provide our *Lotus 1-2-3* users with access to our system HP 2564B printer. We also needed a solution that would work on HP 150s and IBM PC compatibles.

We decided to pursue *Universal Access* from Minisoft. The other solutions we found didn't work with our mixed bag of PCs. When phoning what I thought was Minisoft's East Coast office, I reached Hillary Software. I've since learned that Hillary Software is a distributor of Minisoft's products, specializing in their HP 1000 users. This relationship also gave me my first glimpse of the type of support I was to receive.

Though we purchased our software from Hillary Software, when we've called Minisoft, the people there have gone the extra mile not only to answer our questions, but to help us understand the reasons behind the answer. This has allowed us to share the support function between our technical staff and Minisoft's.

We've taken steps to make sure this service is not abused, but it's definitely a morale boost for our staff when they get a direct answer to a question they have about Minisoft's products.

After contacting Hillary Software, we received a demonstration version of *Universal Access*. The installation instructions were simple and straightforward. Minisoft since has revised the documentation making it clearer and more complete.

The installation involves setting up a Minisoft account on your HP 3000 and loading programs and a UDC file. The software is installed in a directory on the master disc of the PC and a line is added to AUTOEXEC.BAT to load the background program. There also is a control program placed on the PC that allows you to configure *Universal Access*, control printer logging, log onto the host system, transfer ASCII files between the systems and turn the printer redirection on and off.

The configuration options include the type of host system, the communication port, the baud rate, bit and parity setting, an optional logon string, the external or local printer device, the name of the local printer device to be redirected, and the name or device number of the remote printer (see *Figure 1*).

CONNECTING THE LASERJET to the HP 3000 was our next hurdle. After going over Application Notes and some trial and error, we ended up with the following configuration parameters: Device type = 32, Sub-Type = 14, Term Type = TTPCL22, Record Width = 66, Spooled, Driver = HIOASLP2, and a device class of LASERJET.

We also modified the file VFCPCL.PUB.SYS to not turn on automatic perforation skip. This was done by using QUAD (an editor available from Interex's Contributed Library) and changing the Esc &11L to a Esc &10L in the first line of the file.

Once your logon is set up with Minisoft's UDC and the PC software is installed, you're up and running. The only problems you may have are remembering if redirection is turned on or off, and occasionally things will get out of sync between the two computers and hang the PC. This doesn't happen often and is cleared up by resetting the PC, running the control program, aborting the host program

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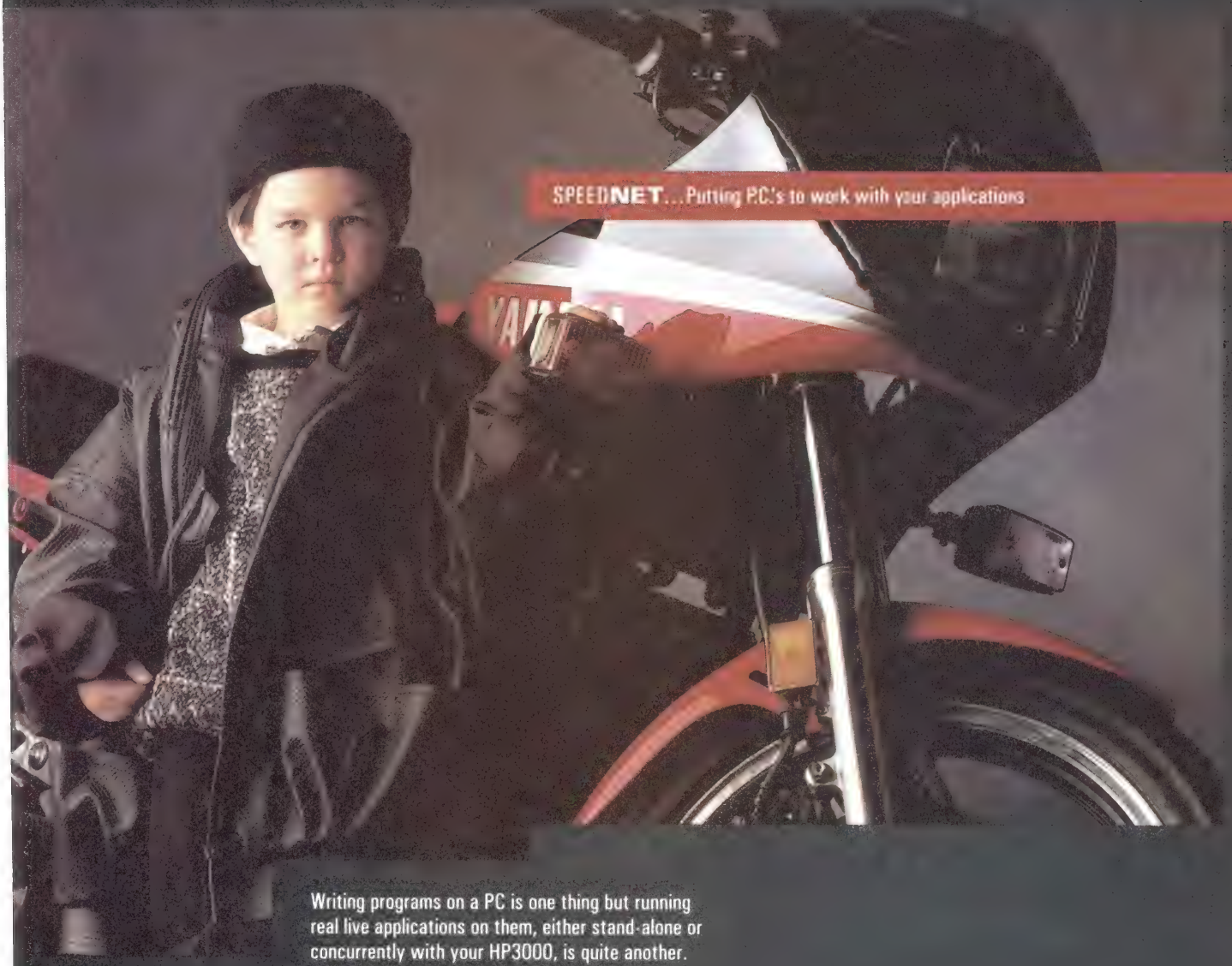

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and turning the redirection back on.

We made up a "cheat sheet" of *Lotus 1-2-3* setup strings and our test user was printing on both the LaserJet and our system printer. While the printing of *Lotus 1-2-3* spreadsheets worked flawlessly, we ran into some problems printing our word processing documents. At the time, we were using *Microsoft Word* (*MSWord*) as our standard word processing package. The most frustrating problem was the inability to print right-justified documents.

When right-justifying, *MSWord* uses escape codes extensively, adding a lot of additional non-printable characters to each print line. The HP 3000 spooler wouldn't pass the complete records to the LaserJet without inserting an additional carriage return and line feeds because of the length of each print line with the embedded escape codes. This same spooler constraint is the reason we still must download the LaserJet's softfonts directly from a PC.

We also were having other problems with *MSWord*. While working on this project, we had changes in our secretarial staff and were giving additional staff the ability to do word processing. We had problems training the new users in using *MSWord*, which caused our technical staff to spend too much time supporting our word processing functions.

In addition, *MSWord* worked differently with each machine type, which made it difficult for us to share documents between machines. Another problem was finding old documents for revisions, because only an MS-DOS filename can be used to track the contents of each document.

The sharing of the LaserJet also presented problems of forms control. We print legal- and letter-sized forms and draft copies on regular paper and final documents on letterhead. The letterhead may be for one of three companies.

The coordination of this soon proved impossible even with just three users. Usually, two would be coordinated to print a "special" form and the

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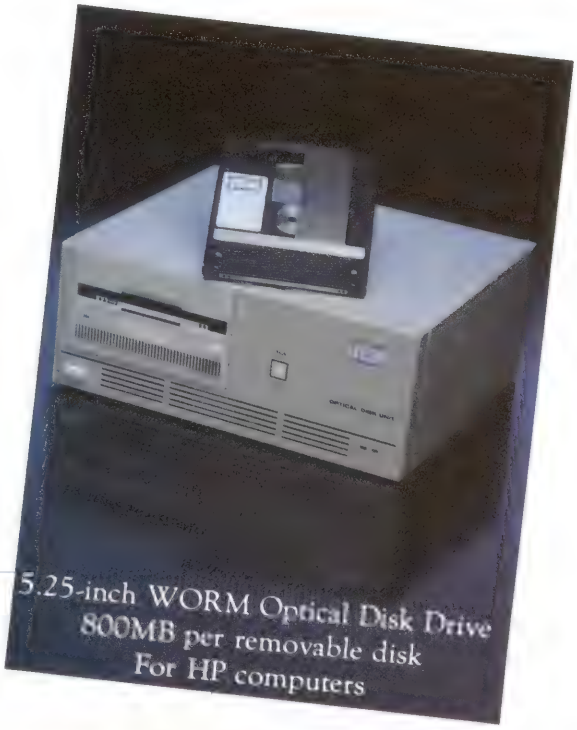

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FIGURE 1

```
Configuration
Host type.....HP 3000 — MPE
Device.....COM1
Baud rate.....9600 Data bits/Parity..8/None
Logon string..HELLO USER.ACCT
Ext. Printer....LPT1
Redirect LPT2          to LASERJET
Print timeout.15
```

third would have perfect timing to print another document in between setup and printing the "special" form.

All of these problems have been solved using Minisoft's flagship product, *MiniWord*. While *MiniWord* doesn't have all the functionality of *MSWord*, we've found it to be a superior product for our needs.

The first area in which MiniWord has become valuable is training. The documentation has an excellent tutorial and reference section. Though the product doesn't have as many functions, we've discovered our secretarial staff likes the product more and, as a result, is more productive due to the support it receives from Minisoft and Hillary Software. In addition, the software doesn't do unpredictable things to documents because of a complicated function it's trying to perform.

The product also operates the same on both the HP 150 and the IBM PC, making support and users helping each other much easier. Our users also have found the solutions to special needs or adjustments in their documents much more logical.

The second area in which *MiniWord* excelled is its ability to share the LaserJet or print at the local printer. The clear documentation and the ability to specifically define the codes for use with different printer functions has made the sharing of the LaserJet much more functional.

For example, you can tell the printer attendant you're going to print a final product and which letterhead to use. The printer codes are set up to ask for a manual feeding of the paper instead of taking paper from the paper tray.

The system also is set up to allow you to specify portrait or landscape mode on either letter or legal size paper. What's special about the Minisoft solutions is the ease with which we set these functions up and the users can use them. This is especially evident in the number of problems they're now able to solve themselves.

The third major enhancement *MiniWord* has made to our company is in the area of sharing documents. We have two offices and were using HP's AdvanceLink to transfer a report to the HP 3000 daily from one office and then transfer it back down to the other office for revisions and distribution. With *MiniWord*, we're able to share a single copy of the document on the HP 3000.

This sharing of files also extends to the files used to control the printer. Instead of having to maintain separate setup files for each micro, they all access the central setup files on the HP 3000. This has reduced the amount of work done by our technical staff to make minor adjustments.

THE DOWN SIDE we've experienced with *MiniWord* is not being able to use the spelling dictionary on PCs without a hard disc, and having to call on some error messages which should be explained in the manual. Another obstacle is that the terminal emulator in the Minisoft product isn't HP terminal compatible. This problem has been fixed with the introduction of the *Minisoft 2392* terminal emulator.

While we started out just looking for a way to share printers, we've ended up with much more. We did have to spend additional money getting word processing programs for each of our PCs; however, we're ahead with the reduced training time, smooth operation of printer sharing, document sharing and improved document control. We've also established a good basis for the future.

Minisoft's ability to work on several machines and to use terminals as well as PCs provides us with the opportunity to tie any of our users into the system. We're also excited about the new products and enhancements Minisoft is bringing out. Some of these products probably will be available by the time you read this.

These enhancements include the ability to run other products from a *Universal Access* menu, windowing of Minisoft's applications, electronic mail, enhanced version of *MiniWord*, a gateway to HPDESK, local print spooling, expanded redirection capabilities and others. Overall, we're pleased to have found a solution to our printer sharing problem and enhanced word processing abilities. We look forward to continued use of *Universal Access* to print Lotus spreadsheets, revise old non-justified *MSWord* documents and create new documents with *MiniWord*. *—Doug Knapman is systems manager at CEMCO Integrated Oil Field Services, Traverse City, MI.*

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CIRCLE 296 ON READER CARD

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CIRCLE 111 ON READER CARD

RE-LEARNING TO PROGRAM

Moving From An HP-85 To A TouchScreen 150 Meant Learning MS-BASIC

PROGRAMMING

Sam Ruvkin

Once you've learned how to program in a BASIC language, it's simple to convert to another dialect. Right. If you're a computer science major it may be so, but let me tell you about *my* experience.

After some success at writing useful programs on my trusty HP-85, I decided the big boys at Hewlett-Packard were right: I did need more memory, two disc drives, a good printer and an easy-to-use touchscreen . . . and I really did need to go with the industry standard operating system. So, I bought the HP-150 TouchScreen.

It was a happy day when I uncrated the boxes, plugged in the cables and let her rip. My main interest was to convert applications I wrote for the 85, for which memory was a problem. With 32K of memory, I found that to do all I wanted I had to split the application into several different programs and limit on-screen instructions and help messages to the minimum. Think of what I could do with 256K (see *Figure 1*)!

A year later I succeeded in converting my applications. Is it that I'm a slow learner? I had invested the time and felt I was a reasonably capable programmer in HP-BASIC. Let me dissect the problem. It wasn't just a straight conversion job. The HP-150 TouchScreen is a better product. More bells. More whistles.

I LEARNED A LOT about escape sequences, about using graphics and how to handle writing to and reading from discs, all while I was relearning BASIC . . . not HP-BASIC, but MS-BASIC. No longer would HP use its in-house language in microcomputers, but would favor the de facto industry standard being used by Big Blue.

The public had spoken. It wanted MS-DOS. With MS-DOS we get MS-BASIC. Now that we have it, can we live with it?

After getting into the subject a little while, I sat back and asked myself, "What's happening?" I had lots of difficulty. Fortunately, I was helped quite a bit by what was at one time an excellent HP service called HPCOACH. Those folks helped me over many rough spots. Pity it's been abandoned.

Here's the problem in a nutshell: MS-BASIC lists in back of its manual a total of 136 "reserved" words. These are programming instructions reserved for the language. We ordinary programmers are prohibited from reusing the words. Of these 136 words, I could find 60 that are the same or very similar to instructions, commands and other words reserved for the HP-85 written in HP-BASIC. That's less than half the number that was in the industry standard.

Also, there are an additional 78 words used in the HP-85 that aren't found in the HP-150. This includes 12 commands for plotting graphs. In the HP-150, plotting is done by use of escape sequences.

Now when I gripe about the difficulty of conversion from one language to the other you'll know why. My griping is as a programmer. I miss the conveniences of the HP-BASIC dialect and the HP-85 product. But is it significant? The real question is, to whom? To me and the other programmers it's important to have easy access to programming tools. But probably less than one-half percent of the users do their own programming.

If that's so, then the other 99½ percent of the users couldn't care less what language or dialect is being used. All they want are good programs that work well and can be transported to other makers' machines. From a

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CIRCLE 126 ON READER CARD

FIGURE 1

	HP-85	HP-150
Memory in bytes	32K	256K
Storage	Tape	3½" discs
Operating system		MS-DOS
BASIC dialect	HP-BASIC	MS-BASIC
Reserved words (no.)		136
Same or similar words	60	
Additional words reserved, or commands	78	

Comparison of Hewlett-Packard computers.

manufacturing and marketing standpoint, it made sense for HP to opt out of its own language and go for the de facto standard. The business judgement was correct.

That doesn't mean I have to like it. I always wanted to be a programmer, and it's my nature to want things orderly. MS-BASIC isn't that.

JUST SO YOU'LL KNOW what I'd like to help me in programming, let me tell you about a few things I had in the HP-85 that I don't have in my HP-150.

First, there are the time-saving tools. Right on the keyboard of the 85 I can press a key and get my often-used instructions out of the way. Take LOAD. It's a keystroke. It's four letters to be typed in. STORE is the same as SAVE. One keystroke. PRINT actually prints what I want it to. LIST lists the source code. It's all neat stuff that helps me, no more.

It would be nice if the Microsoft people revised the MS-BASIC issue to include a simple addition that they already include in GW-BASIC. In it they use the screen labels so a user merely has to touch one to get LIST or to RUN or LOAD (only needing to add the file code) or SAVE and so forth.

I have a few gimmicks I like to use. When my program reaches an interesting conclusion, I like to alert the user with a distinctive sound. On the HP-85, we can simulate a pitch sound with a tone and duration instruction on the BEEP. Not so on the 150 and its Microsoft system and language. I like to PAUSE once in a while to let the user reflect on what I have to tell him. The 150 doesn't do it easily. I'll show my workarounds later.

To be fair, I've gained a lot with the HP-150, of course. I really enjoy the TouchScreen feature. I can't imagine why HP even suggests that someone can buy the unit without it. I think the Personal Application Manager (PAM) saves a lot of time in operating the computer. This feature should be broadcast more. Of course, the two 3½-inch discs are a joy to use and beat the competition to the punch. The added memory allows much more flexibility; so much so, that I find I can be wasteful in writing instructions to the user and adding lots of notes in my programs.

IF YOU'RE PLANNING to convert from HP-BASIC to MS-BASIC, you should be aware of some differences. I already mentioned that over half the reserved words are different. Some of the instructions are similar, but different.

Take DISPLAY. I think HP was right. When something shows up on the screen, it's displayed. It isn't PRINTed. But that's what the standard calls it, so be prepared to call it PRINT when you want a display.

Now let's say you *really* want to print something. Don't say PRINT as in HP-BASIC. Now you say LPRINT. A slight difference, but enough to drive you batty until you get used to it.

> STORE is now SAVE. DATE is now DATE$.
> TIME is now TIME$. REN is now RENUM.

A few more problems of which you should be aware: Sometimes when you're doing arithmetic, the MS-BASIC system gives off odd numbers, like 2 * 3 might be 5.999999. It's like the old-time estimator I knew who rounded off on his slide rule by calling out 2 * 3 is about 5.9. When the odd number shows up, it's not too pretty and may foul up a formatted screen. You'll need to use a PRINT USING command to format it properly.

When entering or editing a line of code, I sometimes go four or five characters before checking and find that I may have a typo. Going back *sometimes* works, but most often will not. (The book says its OK if you haven't pressed RETURN.) I often get that blasted error/beep message. Beware: There's some gibberish that comes in on typeovers.

Wouldn't it be nice it you could find out how much memory is left on the disc in the drive? I've lost data when trying to crowd too much onto the disc. Another caution: You shouldn't try to put onto a disc a larger program than you have in bytes left on the disc.

YOU LIKE VANILLA. I like chocolate. We all clamored for a standard and we got it. That's not to say the standard is better, it's just different. If you want to play in this ball game, you've got to learn

the new rules and play by them.

All isn't lost. Once you get over your frustration and invest the time in relearning how to program and to do it in the MS-BASIC dialect, you can find a few ways to accomplish what you want. It takes a few more keystrokes. You just won't have the HP-85 keyboard helping keys.

Let me show you a few I've done by trial and error and by research. Research is defined as stealing from more than one source. (Plagiarism is stealing from one source.)

My Artificial WAIT:

Since you can't just program a WAIT (see *Note* below), let your computer whir around a lot until the amount of time you want to wait is used up. Do this with a FOR-NEXT loop. By trial and error, I found 1,000 loops is one second. Here's my artificial WAIT. Give the instruction GOSUB 620.

```
620   FOR I = 1 TO 3000 :NEXT I
625   RETURN                    a three-second delay
```

Changing 3000 to 4000 gives a four-second delay. You *can* program an artificial WAIT with this simple GOSUB routine.

Note : Listen to what an authority says about WAIT. David Lien, author of *the ASIC Handbook* (Compusoft Publishing), says on page 366:

"WAIT is used by some computers (e.g., those using Microsoft BASIC) to suspend program execution until the byte value at a specified computer port meets the conditions established by two byte values listed after WAIT.

"For example, WAIT 30, 2, 5 tells the computer to WAIT until a non-zero value is produced when the byte value at port 30 is eXclusive ORed with the byte value 5 and the resultant value is logically ANDed with the byte value of 2. (Oh well . . . back to bird watching.)" That's his comment. Mine is unprintable.

My Attention-Getter

I like to try to get a distinctive sound when I start a program or when something unusual happens in the program and I want the user's attention. Give the instruction GOSUB 640.

```
640   PRINT CHR$(7);: FOR I = 1 TO 100 :NEXT I :PRINT CHR$(7);:
        FOR I = 1 TO 100 : NEXT I : PRINT CHR$(7);
645   RETURN                    beep attention-getter
```

This is as close as I can come to the toodle-oo beep sound that I had on my HP-85.

My Artificial PAUSE:

It's often necessary to give a user some extra time to read any instructions or messages you've flashed on the screen. The HP-85 had a simple PAUSE statement and a key that allowed the user to continue, labeled CONT. Now it's necessary to place another routine in the opening section of my program. Since I know I'll be using these over and over again, I have

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CIRCLE 155 ON READER CARD

FIGURE 2

Step #	Do This	Remarks
1	Enter EDIT 10	/ line 10 is your old line #
2	Press RETURN	/ first time
3	Press RETURN	/ do it again !
4	Press CTRL A	/ to put in edit mode press both CTRL & A keys at once
5	Press L	/ first time
6	Press L	/ do it again ! (line w/o #s)
7	Press I	/ so you can insert new #
8	Type in 35	/ line #35 is new line #
9	Press RETURN	/ you are done
10	Type LIST 10-35	/ check what was done
11	Type DELETE 10	/ if you don't want # 10

Adapted from *The MBASIC Handbook*, by Ettlin & Solberg, McGraw-Hill.

Changing a line number in 11 easy steps.

a section of my programs reserved for something I call "Often-Used Routines." Here's my PAUSE. Call it up by giving the instruction GOSUB 710.

```
710   PRINT TAB(30); "(press any key to continue)"
715   D2$ = INPUT$(1)
720   RETURN                    pause routine
```

The return will be to the next line after the GOSUB, which is shown below as 1000. Lines 1005 and 1010 then follow.

```
1000  GOSUB 710
1005  IF LEN(D2$) = 1 GOTO 1010
1010    [program continues]
```

In line 1005, nothing happens until the user hits a key that's read as the length of 1. The easiest key to use is the largest key, which is the space bar.

OFTEN IN PROGRAMMING, it's convenient to change a line number and to move some lines to another place in the program. With the HP-85, you merely type in the new line number over the old one and press END LINE (the same as RETURN) and the new line appears along with the old one. Simple.

With MS-BASIC, you need to do a bit of editing. Only 11 distinct steps to be exact, but it can be done if you need to, and if the code you want to transfer is so complex that you don't want to reenter it (see *Figure 2*).

I've already given my artificial WAIT routine, but let's see what the *MS-DOS User's Guide* says about it. In one of the charts that shows all the good things you can do with escape codes, it shows that a one-second delay may be commanded by using "Ec @". Another slip-up by the documentor. You have to search to find that "Ec" refers to the escape code. Then really hunt to find that an escape code is really activated by the ASCII code CHR$(27). Finally, they don't tell you this, but the protocol for the HP-150 isn't a space after the escape code, and it's not the & sign. It's the + sign!

So, to use that coding on the HP-150, the instructions are:

```
CHR$(27) + "@"
```

Now you're ready. Put that in and you *can* get a one-second delay. Try to prove it by putting in a TIME checking routine; while you can perceive a delay, the difference in times won't show up.

Now try to get more than one second. It won't work with a STRING$(I,J) command. It will work with several repeated instructions. Why waste your time? Use my simple FOR-NEXT routine. Let the machine loop back 3,000 times. The slave within doesn't mind. Forget the @. I don't know why it doesn't work.

IF YOU'VE EVER TRIED to put together a lawn mower fresh out of the carton, the first thing you do is attack it and open all hardware and spread everything around. Then you try to fit this thing to that thing, because you know that's where it goes. But when it doesn't work, you'll have to heed the warning: When all else fails, read the instructions.

I wonder if documentation writers know that we ordinary people use documents. Sometimes I feel they're writing cryptic

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CIRCLE 220 ON READER CARD

outlines for in-house consumption and that later they intend to fill out the details. So it is with the HP-150 documents. I'd like to talk to those writers.

First, when I unpacked my computer, I looked at it like a computer. It's a package. To my surprise, someone slipped in documentation called *HP-150 Terminal User's Guide*. They must have made a mistake, said I. Then I found a document that's called *HP-150 Personal Computer Owner's Guide*. When I tried to resume programming, I went to another book called *Series 100/BASIC*. It took three books to do what I got out of one HP-85 manual.

Why? It finally became clear to me that they adapted from other things they had and put the pieces together. But, I ask, is it too much trouble to make them accurate? Is it asking too much to have the documents integrated?

Obviously, as you read the documents, you'll see that there are lots of words, instructions and descriptions that need definition. Every industry has its buzz words, but the computer industry has more than its share. I just don't understand why the writers start from the platform that the reader must catch up to them. Why can't they start from the standpoint that most readers don't know their in-house lingo and need to be spoon-fed?

My guess is that someone starting out with a new computer needs to commit to memory some 200 key words, instructions, definitions, reserved words and concepts. Now, I agree that every one of the 200 is a simple concept or definition. But learning 200 of anything is difficult. It takes time, patience and practice to become proficient. It's like a new vocabulary (see *Figure 3*).

I know the preamble to the *Series 100/BASIC* manual reads, "This manual is not a tutorial in BASIC." But to use it, you have to go through what I did. I read the three manuals thoroughly. I tested routines where I could. Whenever I tested something and couldn't get it after a self-imposed time limit of four hours, only then did I call HPCOACH. They sent me an *MS-DOS User's Manual* because they suspected I'd be helped most by reading that. Their suspicions were correct. But I couldn't handle graphics, reading or writing to a disc or handling double-scripted arrays. That's when I looked for the other texts I mentioned before.

Back to HP documentation. I wonder who wrote the MS-BASIC document. Besides being cryptic, it has a number of mistakes. I wasn't pleased to try routines that are shown as if they were source code and have them not work. How could someone put in a routine and not check it out in his own computer? My guess is that someone wrote it for HP, but adapted it from some other computer.

In the introduction to escape sequences, the example cited consists of four lines of rather complicated coding. In those four lines, there are seven corrections!

It's not as if the HP people don't know how to write good documentation. The user's manual for the HP-85 is excellent. It's a tutorial for those who want one; it has good examples, a good glossary and very few errors. We know you can do it if you try.

I really do like the HP-150 as an instrument. It's just about right for a compromise on using the industry standard operating system and language. It continues the tradition of the HP mystique, which says it has quality products. The 150 group obviously knows how to do the difficult things very well. The computer is excellent. The simple things, like writing a manual, they don't do so well.

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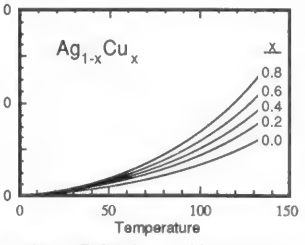

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CIRCLE 139 ON READER CARD

There are really three ingredients to making a good program:

- *You have to have something to say.*
- *You've got to say it well.*
- *You have to edit the output for ease of use.*

The programmer should say something more than just another database, spreadsheet or word processor. How many of these does the world need? If you don't have anything to say, don't say it. But if you do, the world ought to hear it.

It takes a bit of imagination to start with a clean sheet of paper and end up sometime later with 2,000 lines of source code. Start with a flow sheet. That's what the book says. But the nature of the innovative process is such that the flow sheet gives only the broadest of outlines of where you want to go. As you think and develop, new ideas emerge . . . a different routine, a better way to say it, additional alternatives.

Decide before you turn on the machine what you're going to do. Before I sat down to write this piece, I was trying to merge three programs into one. Each one was tried and tested and worked. But in merging, I had duplicating lines, duplicating routines and goto statements that went to wrong places. My flight plan required some deep thinking to eliminate these. I sometimes spend several hours just getting one line of code to respond as I want it to.

Debugging doesn't lend itself to a rational description. Trial and error is my best diagnostic tool. Think about the logic. When I studied sanitary engineering, the favorite quiz question was to describe an analysis that wasn't covered by a formula. The correct answer was, "I'll use the rational method of analysis, meaning, "I'll think about it."

Coding a program in a high-level language like BASIC takes a lot of time. Typically 1,500 lines of code may take a year, depending upon the programmer's efficiency, hours per day of work (weekends or nights?), testing, documentation and thoroughness. Documentation preparation is time-consuming and needed even for the programmer's own use several months later.

Packaging any product is what sells it. Results must be easy to read and understand. It takes time and patience to format the screen and printed output. It's desirable to be concise, clear, readable and pretty to look at.

Instructions need to be clear, too. How do I start? Do I insert MS-DOS first? Is the disc put in drive B?

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I've always used HP products. They're quality products. Now that I'm on my second generation of computer, I'm still satisfied. *—Sam Ruvkun is a consulting engineer based in Piedmont, CA.*

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FIGURE 3

	HP-BASIC	MS-BASIC
Programming words:	DISPLAY PRINT STORE DATE TIME PLIST REN	PRINT LPRINT SAVE DATE$ TIME$ LLIST RENUM
Defining a sub-string:	A$[1,8]	LEFT$(A$,8)
Keyboard Keys:	PAUSE CONT SAVE LOAD PRINT LIST	

Comparison of key words in BASIC.

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QUATTRO

If You Can Avoid Worrying That It's Not *Lotus*, This Package Probably Can Coexist With *1-2-3* At Your Site

VECTRA

Mark Sampson

Quattro doesn't seem to be designed to make us abandon *Lotus 1-2-3*, but rather to coexist with *1-2-3*'s installed base. It offers major improvements over *1-2-3*, but its most significant feature is its *1-2-3* compatibility.

It's not possible to evaluate and review *Quattro* without comparing it to *Lotus 1-2-3*, because *1-2-3* so dominates the spreadsheet market that it has become an industry standard. Even the *Quattro* advertisements make these comparisons, and compatibility with *1-2-3* is one of *Quattro*'s strongest assets.

For two months I've used and evaluated *Quattro* on an HP Vectra and several IBM PCs and clones, with and without hard discs, and in both monochrome and CGA color. I've found much to like about *Quattro*, and very few reasons to hesitate to purchase it for any spreadsheet use. Those few hesitations are detailed below.

Quattro comes with four 5¼-inch discs (or two 3½-inch discs), three excellent manuals, two different templates for different function key arrangements, two fold-out menu trees and a reference card.

The *Quattro* menu trees are cross referenced with page numbers in the *Reference Guide*, which is a superb second index. It includes several add-in programs: *SQZ! Plus*, which compresses files up to 90 percent on your disc, *Menu Builder*, which allows you to create custom applications, and *Transcript*, which records all keystrokes. *Transcript* can provide automatic protection against power failure or system crashes and an audit trail of all changes made to an existing spreadsheet.

The list price is $199.95, but it is widely available for less than $130, and I've seen it advertised for under $100. The price is certainly reasonable when you consider that the fair value of the three add-in programs is about $200.

TO INSTALL ON A hard disc, simply copy the files to your hard disc. There's no copy protection to bother with. Installing on floppies takes less than one minute after you've formatted four blank discs. Entering "floppy" will trigger the prompts needed to install onto floppies. The instructions in the *Getting Started with Quattro* manual are easy to follow, although there were a couple of mistakes that were corrected in a "readme" file on the disc. These now may be corrected in the manual.

There are up to four prompts in the floppy installation routine where you choose between *Quattro* and *1-2-3* menus, and a color or monochrome system. On a hard disc system, *Quattro* attempts to automatically detect the type of video adapter. This simplifies installation. It appropriately identifies the Vectra multimode video card as "CGA," which causes different colors to be displayed as shades on a monochrome monitor. You can disable the auto-detect for an unusual monitor and adapter card.

There's a six-lesson tutorial in the *Getting Started* book that's well written. Experienced spreadsheet users probably should do the lessons on graphs and macros.

One test I like to make of a program's user interface is to see how far I can get before I open the manual. After installation, I did several worksheets using the *Quattro* interface without any difficulty. The *Quattro* interface is fairly intuitive, and much of it is identical to *1-2-3*. I also must admit that I have prior experience using *1-2-3* and another spreadsheet.

Quattro has excellent help screens that are

context-sensitive. From any command menu, pressing F1 (function key 1) will display a help screen for that command (see Screen 1).

Converting a spreadsheet to a dBASE file couldn't be easier.

THE MOST OUTSTANDING feature of *Quattro* is its compatibility with *1-2-3* and other programs. The user can switch between a *Quattro* interface or a *123* interface (see Screen 2). *Quattro* uses a pull-down menu, rather than commands across the top, but the commands in the *123* interface are identical to *Lotus 1-2-3*. Therefore, an organization that trains and supports *1-2-3* can support *Quattro* with almost no change.

I've had several *1-2-3* users of various skill levels use *Quattro*'s *123* interface without any instruction. Their main comments have been that *Quattro* seems faster and graphs are much easier.

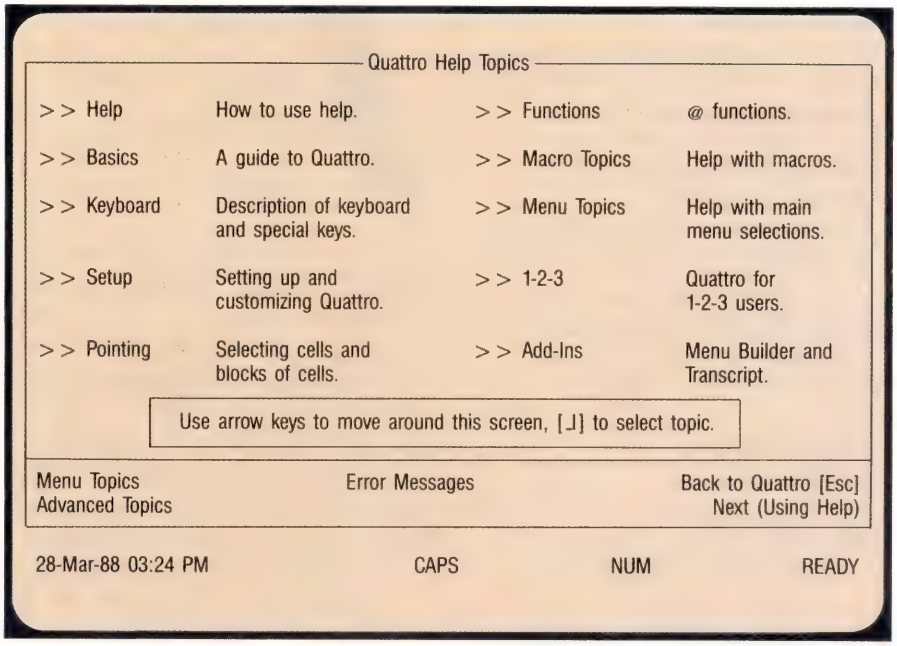
Quattro automatically will retrieve and save *1-2-3* Release 1 or Release 2 files as *Lotus* files. It will do the same for *Paradox*, *dBASE* and *Symphony* files, saving them in their original format.

I've alternated about 50 file retrieves and saves between *Quattro* and both versions of *1-2-3* without any problems. In retrieving a file, *Quattro* prompts you with "*.wk?". Pressing enter will list all *Quattro*, *1-2-3* and *Symphony* files, both regular and compressed by *SQZ!* To list *dBASE* files you need to replace the prompt with "*.DBF" and to see all files, replace it with "*.*".

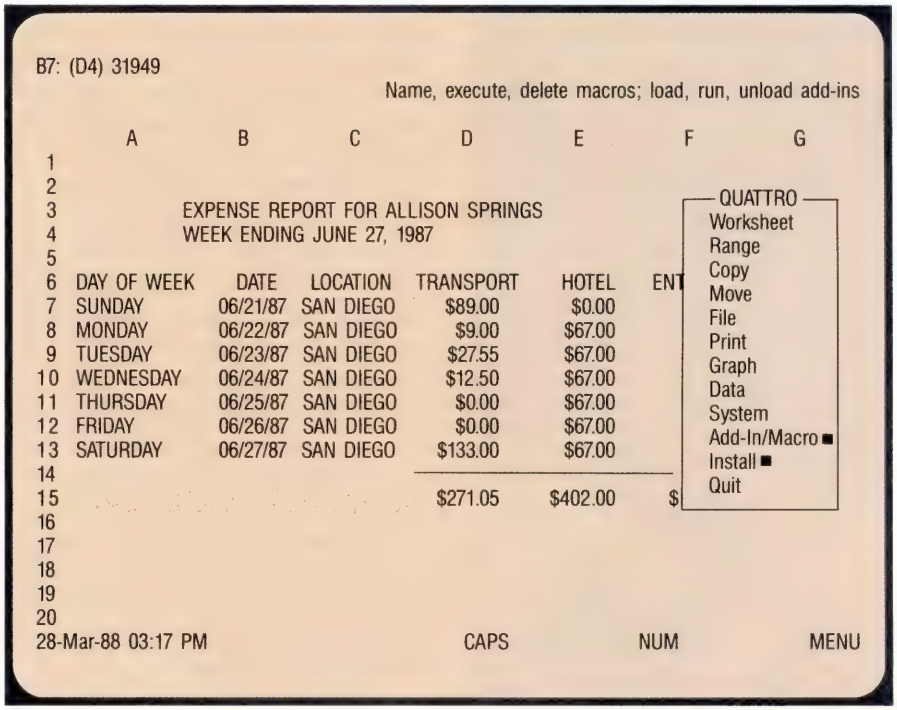
Converting a spreadsheet to a *dBASE* file couldn't be easier. You simply change the file extension to ".DBF" or ".DB2" and save the file. Spreadsheets and databases handle dates differently, so *Quattro*'s dates are just five-digit numbers in *dBASE*, and *dBASE* ignores the " \ " character that we use to draw lines across our spreadsheets.

I would argue that a record filled with " \- " or " \ = " doesn't belong in a database anyway. In any case, being able to retrieve and save these files is much better than the alternatives of doing a file import or conversion.

I DISCOVERED A COUPLE of minor quirks. Using a Vectra with HP's multimode video adapter and monochrome moni-



Screen 1: The main help screen. Many more context-sensitive help screens are available.



Screen 2: The main command line of the 123 interface. Items with a square after them are not available in 1-2-3.

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tor, unprotected cells were invisible on the screen until I moved the cell pointer to them. I discovered that these cells were displayed in blue on black, which didn't show up. Changing the color with the "/DCSU" command (*Quattro* interface) or "/ICSU" (*123* interface) solved the problem.

Executing a macro is a simple "point and shoot" operation.

On the plus side, on a color system, labels, boarders and unprotected cells are different colors and different shades on the HP multimode monitor. When displaying graphs to the screen with a CGA monitor, you can select either 640 times 200 resolution in black and white or 320 times 200 in color (/GCR).

When files saved on the HP 150 (Touchscreen) were retrieved, I consistently saw an error message, "Error detected, bad window data, press space bar," but the files appeared fine. I called Borland's help line and was told that the cause for the error message is that *Quattro* supports only 80 characters on the screen, while *1-2-3* can be installed to support either 80 or 90 characters.

He assured me that *Quattro* will have no difficulty reading or saving the files, which also has been my experience. While his explanation didn't specifically mention the HP 150, I felt it still answered my question.

I got through to the help line on the first try, even though I called at lunch time in California. I felt my inquiry was handled efficiently and courteously.

Quattro isn't available for the HP Touchscreen (150). I tried to run it using the program "PC.EXE" and was able to get the program to load, but then it locked up the system.

We successfully plotted on an ancient IBM color plotter (which isn't included on *Quattro*'s list of choices), simply by calling it an HP 7475. This hasn't always worked with other programs.

Graphs are stunning and can be printed without exiting to a separate program. Ten types are available and they're very easy to customize (something I avoid with *1-2-3*). You can save and later display, modify or print many graphs with each spreadsheet using the "/GN" (Graph Name) command.

Displaying a graph that has been stored is accomplished by selecting it from a list. You can configure several printers for both worksheets and graphs and switch between them using the command menus. Graphs are saved as part of the spreadsheet, but also can be saved as a ".PIC" file for use with other graphics programs or as an ".EPS" file for use with a program that supports PostScript.

Executing a macro is a simple "point and shoot" operation. You press F8 (function key 8, the "macro" key) and select the macro from the displayed list. The "/ME" (Macro Execute) command works similarly. There are enough helps for recording and debugging macros that they begin to emerge as useful tools and cease to appear as some form of black magic.

Pressing Alt-F3 displays a list of functions. When you move the cursor to one and press "Enter," the function is written to the cell where you can add the argument.

MANY OF THE ADVANTAGES of *Quattro* over *1-2-3* were discussed earlier, but to summarize them and add a few more, the main advantages are:

■ Quattro *is not copy protected, relying on trust instead.*

Quattro
Borland International Inc.
4585 Scotts Valley Dr.
Scotts Valley, CA 95066
Price: $199.95
CIRCLE 300 ON READER CARD

dBASE
Ashton-Tate
20101 Hamilton Ave.
Torrance, CA 90502-1319
CIRCLE 299 ON READER CARD

Lotus 1-2-3, Symphony
Lotus Development Corp.
55 Cambridge Parkway
Cambridge, MA 02142
CIRCLE 298 ON READER CARD

Paradox
Ansa Software
1301 Shore Way Rd.
Belmont, CA 94002
CIRCLE 297 ON READER CARD

Sideways
Funk Software
222 Third Street
Cambridge, MA 02142
CIRCLE 294 ON READER CARD

SQZ! Plus
Symantec
10201 Torre Avenue
Cupertino, CA 95014
CIRCLE 295 ON READER CARD

- *Printing and plotting graphs are included in the main program.*
- *The graphs are brilliant, and several additional types are available.*
- Quattro *can retrieve and save* Paradox, dBASE *and* Symphony *files, in addition to both versions of* 1-2-3.
- *The* Quattro *interface saves keystrokes and offers additional functions.*
- *Macros are a breeze.*
- Quattro *is slightly faster than* 1-2-3.
- *Three good add-in programs are included.*
- *Dates are easy to enter.*
- *There's an intelligent exit that prompts you only if the worksheet has been changed.*
- *The cost is reasonable and less than half that of* 1-2-3.

I found only several disadvantages of *Quattro* compared to *1-2-3*, but they may be critical to a purchasing decision. *Quattro* takes about 100K more RAM than *1-2-3* Release 2.0. If your spreadsheets barely fit into memory now using *1-2-3*, you may need either to expand your RAM or divide your spreadsheet in half to use *Quattro*.

If you've installed memory-resident add-in programs into *1-2-3*, most won't work with *Quattro*. Many add-ins, including *Sideways*, will work fine with *Quattro* if used externally.

To use *1-2-3* macros in *Quattro* and vice versa, you must use *Quattro*'s *123* interface.

Quattro includes all of the functions of *1-2-3* and much more. However, I still found a few things I wish Borland International had done differently. There's about 100K less memory left for a spreadsheet than with *1-2-3*, which limits a spreadsheet to about 300K unless you have expanded memory. I'd like an option to run a scaled-down version, possibly without graphics, for huge spreadsheets.

Running *Quattro* on a floppy system seems to involve a needless switching of discs. You start with the System disc in A: and the Resource disc in B:, then switch the Resource disc to A: and your data or the Help disc to 8B:. Running it from a single disc, typical of a hard disc system, when you haven't copied the files to the hard disc is possible but involves numerous switches of the System and Resource discs to load.

It's great how you can select functions from a list. If the cursor always returned to the last function selected, it would be perfect.

Quattro is a nice improvement over *1-2-3* Release 2, at less than half the cost. It isn't a generation better like *1-2-3* was over *VisiCalc*. The advertisements had prepared me for a tool that also would brew coffee, but all I found was an excellent spreadsheet.

I think many people will prefer *Quattro* to *1-2-3*, if they can avoid worrying about it not being *Lotus*. Then *Quattro* will be able to coexist very nicely with *1-2-3* in most organizations. *—Mark D. Sampson is personal computer coordinator, Ocean Systems Division, Gould Electronics, Glen Burnie, MD.*

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CIRCLE 141 ON READER CARD

WORKSTATIONS

Bob Youngquist

HP-To-PC File Utilities

Over the years, while workstation users weren't looking, the IBM PC evolved into a useful machine. The huge market potential of the MS-DOS computer has attracted a great deal of effort in both hardware and software development. Some of the latest 80386-based machines compare favorably with low-end 68000 workstations in computing performance, but when it comes to software, the PC is the clear winner if volume, variety and price are criteria.

In business applications, the PC has a decided advantage. Word processors, spreadsheets and publishing tools can be as valuable to engineering departments as they are to the marketing people. Increasingly, workstation users are turning to PCs to utilize these programs, as well as engineering, mathematical and program development applications.

Fortunately, with the right software, a data link between the HP workstation world and the PC is easy to establish. HP adopted a standard called the Logical Interchange Format (LIF) for data exchange among its various computers using floppy discs. This enables the exchange of text files between HP computers. With the proper file conversion utility, this link can be extended to the PC.

In this article, I'll discuss programs from three companies: A Gentle Wind Inc., Innovative Software Systems and Oswego Software. All of these programs run on the PC and, with varying degrees of success, allow it to read and write LIF discs.

IN MANY WAYS, the three utilities considered here are remarkably similar. Each has the capability to transfer only LIF files or binary images of files. Unfortunately, LIF is not the native format for HP workstations, necessitating a conversion step before the files are taken to the PC. Binary images of files are of limited usefulness except for special applications that are designed to deal with their particular format.

The conversion of PC files to LIF files is limited to ASCII files and binary images of files. It should be noted that many MS-DOS programs don't store their files in ASCII format. Once again, a separate conversion step may be necessary, but in most cases, PC programs either have the capability to generate ASCII files or supply a utility for that purpose.

HP has never let standards stand in the way of progress and, over the years, it has engendered numerous drives, media and software systems. The challenge to software developers in this field is to design a program that will work flawlessly on media from a variety of hardware. The discs used to test these programs were created on an HP 9000 Series 350 under the PASCAL system equipped with a 9133 disc drive (a 40-MB HPIB drive with a 720-K double-sided floppy). This is by no means an exhaustive test, but it proved rigorous enough to uncover some significant problems with two of these programs.

In spite of these limitations, the floppy-based "sneaker-net" approach to data transfer can be a viable method of data migration between PC and workstation.

Hardware Requirements

All of these programs require a PC, AT or compatible with at least two disc

FIGURE 1

Benchmarks

	LIF to PC	PC to LIF
IBM PC to HP File Copy	49.2 secs.	83.7
File/Swap-PC	29.3 secs.	31.0
PCLIF	26.4 secs.	——

All benchmarks were performed on a 10-MHz, PC-compatible with a 3 1/2-inch internal disc drive and a 40-MB, 40-msec hard disc drive. LIF to PC is the time taken to copy a 286-block LIF file to the hard disc. PC to LIF is the time taken to copy a 73,943-byte file from the hard disc to the 3 1/2-inch, single-sided floppy. Files used for this test were generated on a Series 350 equipped with a 9144 disc drive.

drives. If you want the ability to make transfers directly between two floppies, you must have two floppies installed in your machine. None of these programs can use one drive to read both LIF and DOS discs, but they do support transfers from floppies to hard drives.

All three programs support the 3 1/2-inch drives common on HP computers and, more recently, adopted by MS-DOS portables and the IBM PS/2 line.

IBM PC To HP File Copy

Oswego's entry in this field is an interactive program that copies to and from LIF and Series 80 files. Its features are accessed by means of a numbered menu. In addition to copying files and providing directory listings, it can erase and unerase single files from a LIF disc or "zap" the entire disc.

Oswego's weak suit is the user interface. Each time a command is selected, the screen is cleared. This means that the directory listing is lost every time you perform another operation like copying a file.

Copying files from LIF to DOS is simply a matter of choosing the names of the source and destination files. But copying a DOS file to a LIF disc is more involved. As part of a three-step process, you first must calculate the size in blocks of the LIF file, then create a file of sufficient size and make the file transfer. The other programs tested accomplished this same task with a single step, which leads me to wonder why Oswego couldn't simplify its process.

A third annoyance is the copy protection. Although you can install the program on a hard disc, at startup the program requires the original disc in the floppy drive. Fortunately, 5 1/4-inch and 3 1/2-inch versions are available.

This program is no speed demon (see *Figure 1*). However, more important, of the three programs tested, it was the only one that performed the tests without error.

PCLIF

PCLIF by Innovative Software Systems comes in an interactive version as well as two command line utilities, LIF2DOS.EXE and DOS2LIF.EXE, which are intended for batch processing. These two programs did not do wildcard expansion, but a latter revision, which should be available by press time, will include this feature. Conspicuously absent from the command line environment is the ability to get a LIF directory.

The interactive version of the *PCLIF* is controlled by a softkey interface familiar to HP BASIC users. The softkeys, which are aligned along the bottom of the screen, can be activated by highlighting the desired key by means of the

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arrow keys and striking return or the space bar. The softkeys also correspond to the function keys on the PC keyboard. Unfortunately, the softkeys are labeled with their program function only and not the function keys to which they relate. This is a minor annoyance to adherents of the original PC- or AT-style keyboards that have the vertical arrangement of function keys.

In business applications, the PC has a decided advantage.

The documentation supplied with this program is generally quite good with one exception: The explanation of the PASCAL system GET and SAVE commands confuses their function with the commands of the same name found in the BASIC system.

During my tests, I encountered one flaw in an otherwise agreeable program. In spite of repeated attempts, I could not successfully copy DOS files to 3 1/2-inch, single-sided LIF discs. Each time it would abort with a DOS file-read error message; however, the program did write successfully to double-sided discs and 5 1/4-inch discs.

File/Swap-PC

File/Swap-PC is an interactive program with a convenient, efficient menu interface. Its features are accessed by striking the key corresponding to the initial of the desired feature.

File/Swap-PC has several useful features not found in the other programs. The Browse option allows you to view the contents of either a DOS or LIF file. Other conveniences include the ability to format read and write to LIF, Series 80 or CP/M discs and to print files from within the program.

Like the others, this program isn't without its faults. The program punctuates every action with annoying video-game-style sound effects. Unless you're in the habit of conscripting your six-year-old son to do your file chores, their inclusion seems pointless. They can be turned off with an option in the Utility menu, but this must be done every time you run the program.

Another problem concerns the way the program converts the LIF format. A line of text in a LIF file always is an even number of bytes. Odd-length lines are padded with a null character. When *File/Swap-PC* converts LIF files to DOS, it includes these nulls. Most DOS applications aren't affected by the characters, but they do clutter the editor screen needlessly. A simple C program can strip them from the file, but this added step shouldn't be necessary.

I encountered a more serious problem with this program when I attempted to use it in the process of porting a large PASCAL program from the HP 9000 to the PC. With alarming regularity, the program would introduce random garbage into my source files. After repeated efforts, I abandoned the operation.

A BASIC Alternative

An alternative approach is provided by Meadow Soft Works which offers a DOS/LIF translator, *DOS-a-LATOR*, that runs under the BASIC operating system on HP Series 200/300 machines equipped with either a 9125 or 9127 disc drive. It performs many of the same functions as the other programs reviewed, but does it all on the HP workstation. HP 9000 users who need to exchange data with a DOS machine, but do not possess one themselves, should investigate this program.

Unfortunately, support for hard drives is limited to the two mentioned above, so I couldn't test the program.

FOR A SMALL COMPANY working in a small market encompassing many different hardware/software combinations, providing a program that functions perfectly under all conditions is a serious challenge. However, at prices ranging from $300 to $500, one is inclined to expect a solid, usable product.

Before purchasing any of these programs, I would contact the manufacturer and determine if the program has been tested thoroughly with your hardware/software combination. If it hasn't, ask for a trial period or money-back guarantee and be prepared to enter the fascinating world of beta testing. *—Bob Youngquist is president of Insight Instrument Corp., Fort Erie, Ontario.*

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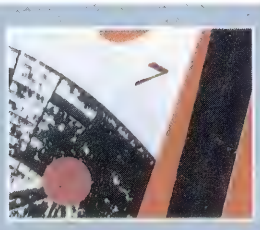


DEVELOPMENT

Lisa Burns Hartman

Quality Software

I've worked in software for seven years now and my experiences with quality have been varied. I worked with one team that could never quite get the process down — our releases had consistent problems. Another project team was always so schedule-driven that we went to our first user site test knowing that much of the code never had been tested, and parts that had been tested flat didn't work.

I've also been fortunate enough, however, to work on two different projects where the quality of our product was consistently high. Installation steps worked without a hitch, and only very minor problems occurred during user testing. Let me assure you, these last two projects were much more pleasant for everyone involved!

So what was the difference between the high- and low-quality projects? The programming staff was no better on the successful projects. The programming tasks were no easier either. One of the big differences, however, was that software walk-throughs were held at every phase in the successful projects.

A walk-through, called a peer review, code review or software inspection in some shops, is a process by which material to be released to users is reviewed by project team members with the goal of identifying errors, needed clarification or omissions. Project members receive this material in advance of the walk-through meeting and spend time reviewing it by themselves.

Then, at the meeting, members point out logic errors, unclear documentation or missed test procedures or data cases. The author of the material then has the opportunity to correct these problems before the material is released to the project's users, or before the next phase of the project is started.

WHAT KINDS OF MATERIAL can be reviewed in a walk-through? Project phase documentation, such as investigation write-ups, external specifications, internal specifications and design alternatives can be examined in a walk-through. The cost of catching a design error during the external specifications phase, before a single line of code has been written, is exponentially lower than correcting the same error after the code has been released to users. Thus, walk-throughs conducted on these design documents are perhaps the most important of all.

In addition, of course, walk-throughs can be held on code itself. Logic errors, omitted data cases and other program defects can be prevented in this way. Perhaps more important, problems with explanatory comments and maintainability of code also can be prevented by walking through source code.

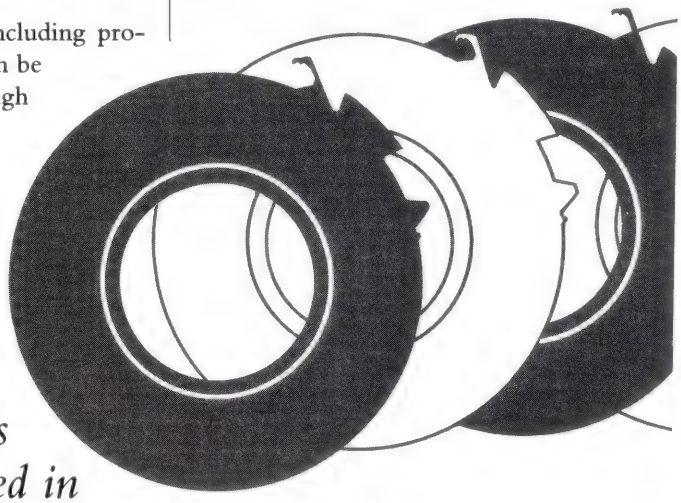
Finally, test plans including procedures and test cases can be reviewed in a walk-through before the test is executed. This can help identify missing or erroneous test cases before the investment of testing time has occurred.

In addition to project team internal documentation, user documentation can benefit from the walk-through process. User guides, training material and operational guides can be reviewed in a walk-through meeting for clarity, technical correctness and completeness.

Catching errors in these documents before they are distributed can prevent hundreds of unnecessary calls from confused users, and can prevent the cost of reprinting incorrect manuals.

So, now you know that you have some material that ought to be reviewed. How do you go about conducting the walk-through process? The steps in the process are as follows:

- *Complete the material to be reviewed.*
- *Choose the participants and a time for the walk-through.*
- *Distribute the material to the participants.*
- *Prepare for the walk-through.*
- *Hold the walk-through meeting.*
- *Resolve any problems identified in the meeting.*



Logic errors, omitted data cases and other program defects can be prevented in this way.

FIGURE 1

AGENDA

DATE DISTRIBUTED	March 28, 1988
DISTRIBUTED BY	Lisa Burns Hartman
MEETING DATE/TIME/LOCATION	Cape Cod room, 1 p.m. April 6th
MATERIAL TO BE REVIEWED	System Test Plan

MATERIALS

1. System Test Plan
2. List of service request included in release G.00.00
3. List of improvements identified in release F.00.00 debriefing

OBJECTIVES FOR REVIEW

1. Check set-up for completeness, clarity.
2. Check versions of interfaces for accuracy.
3. Check test step completeness.

WALK-THROUGH TEAM

FACILITATOR	Joe Smith
READER	Mary Jones
AUTHOR	Lisa Burns Hartman
REVIEWER 1	Bob Terry
REVIEWER 2	Don Jackson

The first point, complete the material, may seem obvious. However, scheduling a walk-through meeting before code is completed for a module, for example, may result in frustration for the participants when the meeting is postponed due to an unforeseen problem. Likewise, distributing one version of a manual to walk-through participants and then replacing it with another version at the walk-through meeting itself also will cause frustration.

Conversely, waiting until two months after a test plan was written before holding a walk-through will produce different problems. The author may not recall why some test cases were included and others omitted by that time. For this reason, it is best to wait until the material is complete, then hold the walk-through within one or two weeks.

Choosing participants for a walk-through is one of the keys to making the process work well in your organization. Choosing at least three, but no more than six, participants works best for us. Always include a user or user representative in every walk-through, even if the material is very technical. It is important to retain the user perspective throughout the life of a project.

Similarly, if you're attempting some very difficult techniques in code being reviewed, you may wish to include a technical expert on the walk-through team. Finally, if you're working on interfacing specifications, you may wish to include a member from the project with which you're exchanging data to ensure that their requirements are met.

One final note regarding choosing participants: Remember that the whole point of the walk-through process is to identify potential problems with your software or documents. Therefore, it's important that people feel comfortable enough to point out errors and problems to the author of the material without fear of negative consequences.

For this reason, it's usually best not to include supervisors of the author in the walk-through meeting. This way, the number of errors found in a person's work cannot influence his supervisor's estimation of his ability.

In terms of scheduling the meeting, be sure that all members can attend at the chosen time. Choose a location where participants won't be interrupted, and allow one hour for the meeting.

At this time, you also may want to assign roles to the participants. You may choose a reader who will lead the group through the material during the meeting. You also may want to assign a facilitator who will ensure that the group stays on track and who also records any problems or suggestions identified during the meeting.

The next step in the process is to distribute the material being reviewed to the walk-through participants. The most important thing about this step is to ensure that people have adequate time to review the material prior to the meeting. This means materials must be distributed at least 48 hours ahead of time. Four days ahead is better and will help ensure that participants prepare adequately. The author will need to allow enough time in his schedule to duplicate the materials and distribute them this far in advance.

In addition to the material actually being reviewed, you may want to provide supporting material to help the participants understand the scope of the project. For example, if a new module is being reviewed, you also may want to distribute code for the module that will call the new module.

In the case of an internal design document walk-through, you may consider providing the external specifications of the same module so participants can check that the internal design meets those specifications.

Include an agenda page with the material distributed. A sample is shown in *Figure 1*. The agenda includes the time, date and location of the walk-through meeting, the participants and

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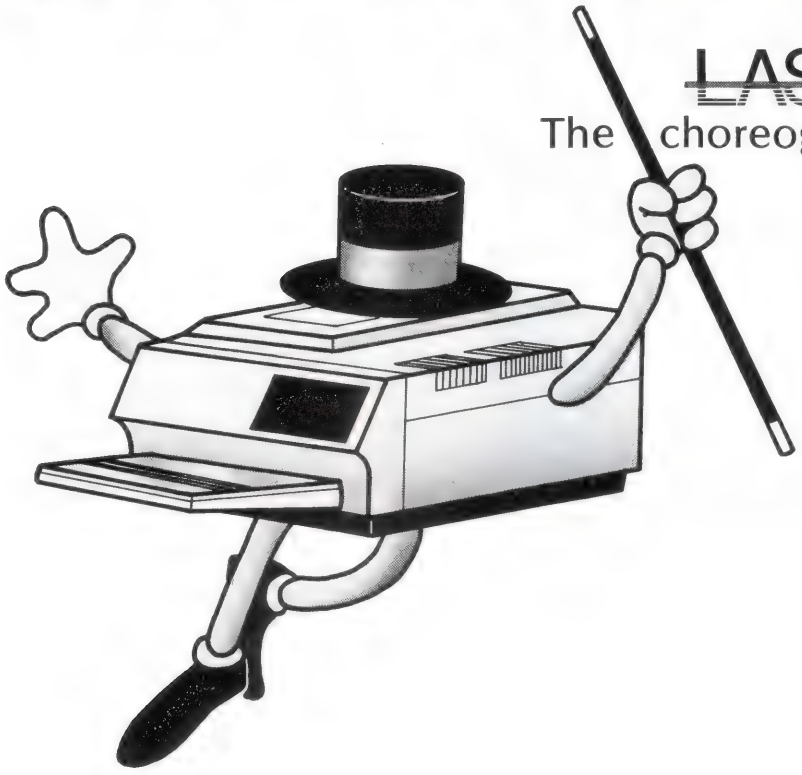

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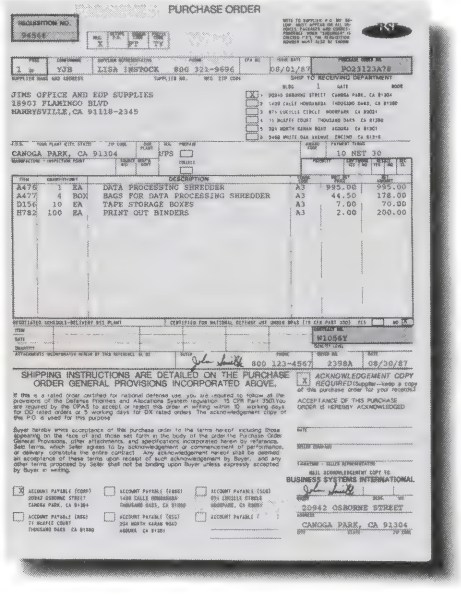

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their roles, a list of the material being reviewed and a list of all additional material being distributed to participants.

Finally, the agenda includes a note regarding anything special you'd like the participants to be especially careful to check for. In this example, the author wants us to check the setup procedures for completeness and clarity, to ensure that versions of interfaces specified are correct, and to ensure that the test steps are complete.

The entire meeting should take no more than one hour.

ARMED WITH THE AGENDA, the supporting material and the material to be reviewed, the walk-through participants begin preparing for the meeting. Preparing will take between 45 minutes and two hours, and participants will need to plan accordingly.

As they examine the material, they should consider the effect of a new module on existing code, or of changes to the system on all aspects of the software. The checklist shown in *Figure 2* may help the reviewers to consider the effect of a change on different parts of an application.

Now we're ready to hold the walk-through meeting itself. The reader takes the group through the material, asking for any problems or questions at each paragraph or section. Participants point out any areas in the material that they feel are in error, are in need of clarification or could be improved.

The facilitator notes these points on a log sheet. A sample format for the log sheet is illustrated in *Figure 3*. At the end of the meeting, the log sheet is given to the author of the material so corrections can be made. The entire meeting should take no more than one hour.

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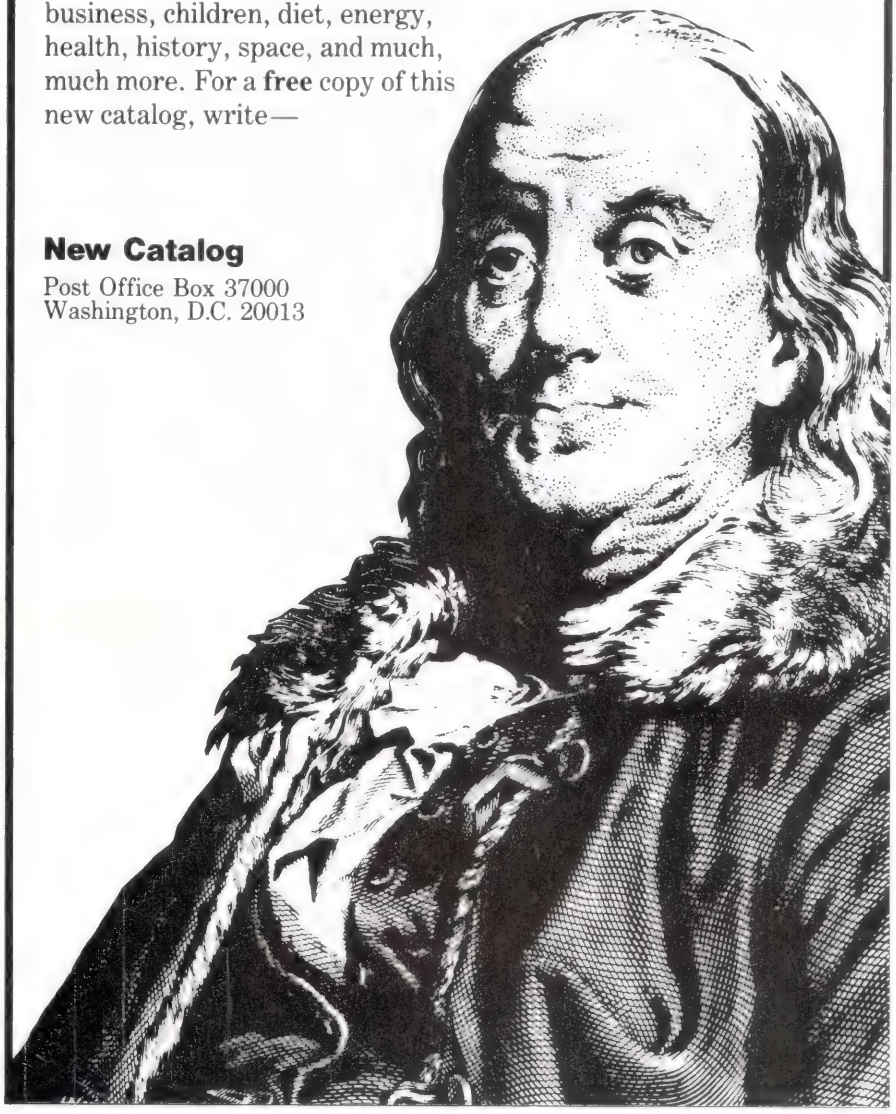

FIGURE 2

CHECKLIST FOR WALK-THROUGHS

1. TECHNICAL ISSUES

- ☐ Is the source code copylib affected? Are $INCLUDE files affected?
- ☐ Will other programs need to be recompiled? Tested? Which modules are affected?
- ☐ Is the database affected? Which items will be added, renamed?
- ☐ Does the data dictionary need to be updated for this change?
- ☐ Will product installation steps need to be adjusted? Does the database need to be converted? Is new JCL being released?
- ☐ Is a new forms file required for VPLUS screens?
- ☐ How is stack space affected by this change?
- ☐ Are group or account SL changes required for this change?

2. USER ISSUES

- ☐ How will the change affect users? Do manuals need updating?
- ☐ Will training need to be prepared? Will hands-on training be needed? Will existing training modules need to be updated?
- ☐ Will office procedures for system use need to be changed?
- ☐ Will users need to prepare data for the installation of this software? What manual steps will be required in the installation?

3. INTERFACE ISSUES

- ☐ Which interfacing systems are affected by this change? Will testing need to be conducted with these systems?
- ☐ Is this feature dependent on changes made by another team?
- ☐ Does this change require code supplied by another team? Which version of that code is required? Will the subroutine be prepped in or accessed via an SL?
- ☐ Are interface file formats affected? Which teams must be notified of the format change?

4. TESTING ISSUES

- ☐ Does this change require special test data? Specific test environment?
- ☐ When will new code from other teams be ready for testing?
- ☐ Will other teams need to be involved in testing?
- ☐ Who will supply test data?
- ☐ Is a special test environment required for this change?
- ☐ Does this change require a specific version of third-party software?
- ☐ Does this change require a specific version of MPE?

The most important thing about conducting the walk-through meeting is to create an atmosphere in which participants are comfortable identifying potential problems, but at the same time the author of the material doesn't feel threatened. It's important for participants to employ tact when pointing out potential problems.

One rule to follow here is to be impersonal with criticism, but personal with praise. For example, if a participant finds a potential problem in a documentation paragraph, he might say, "I think a user might be confused by the explanation of the new field in section 2." If a participant has been especially impressed by something in the material, however, he might say, "I especially liked your explanation of the new report in section 3."

The next most important thing about the walk-through meeting is to ensure that the discussion sticks to problem identification, not problem solving. Participants should point out logic errors or omissions and shouldn't concern themselves with how to correct them.

Also, participants should be careful to concern themselves with functionality, not style. This means if a program conforms to shop standards and is functional, the fact that the author uses a different style of writing shouldn't be an issue. The walk-through facilitator can help keep the participants on track in either of these cases.

Participants should point out logic errors or omissions and shouldn't concern themselves with how to correct them.

Once the meeting has concluded and the list of potential problems has been compiled, it's the author's job to make corrections and clarifications to the material. At this point, he may do one of two things: If the list of problems is short and the corrections can be made easily, the author simply makes the corrections and notes how each was resolved on the problem log sheet (see *Figure 4*). The updated sheet then is redistributed to the walk-through participants.

If correcting the problems will be a larger task, the author makes the corrections and then schedules a second walk-through meeting with the same participants. At this second meeting, the reviewers will walk through the corrected material. In some shops, if the corrections take more than one day to make, a second meeting must be scheduled.

Either way, the walk-through participants are informed of the way each point was addressed, so they can voice any concerns about the correction.

This process of walking through

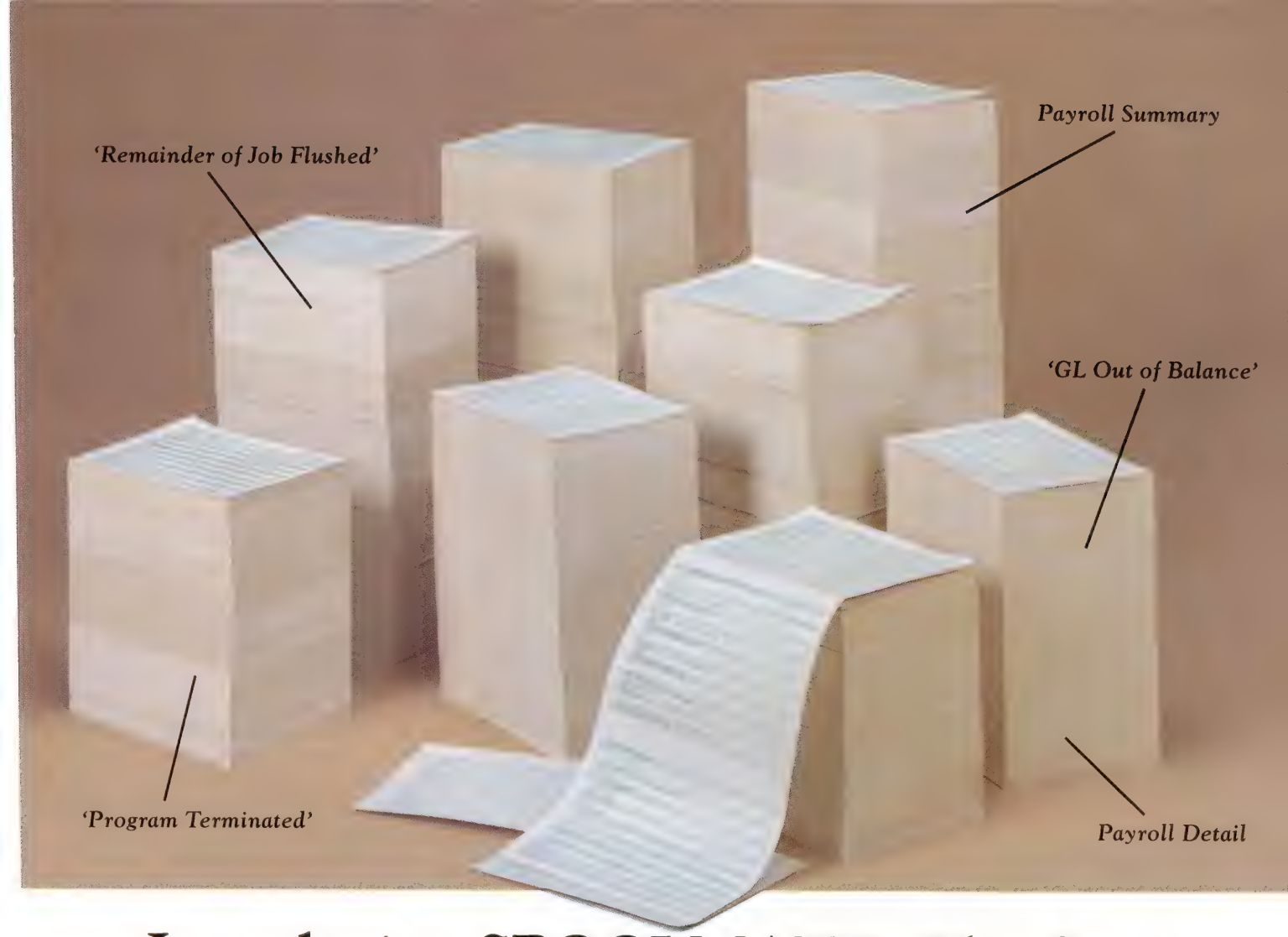

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FIGURE 3

LOG SHEET

PAGE 1 OF 1 **WALK-THROUGH DATE April 6th, 1988**

MATERIAL REVIEWED System Test Plan
SERVICE REQUEST # G.00.00 release

PARAGRAPH/ LINE/PAGE	DESCRIPTION	TYPE	RESOLUTION
Section 1	Incorrect version #	Error	
Section 1	Add specification of MPE version	Omission	
Section 2	Add step to test various printer models	Omission	
Section 3	Include unit test for search criteria change	Omission	
Section 4	Step to initialize database should come before data extract step	Error	
Section 4	Expand description of file manipulation steps	Clarity	

FIGURE 4

LOG SHEET WITH PROBLEM RESOLUTION NOTES

LOG SHEET

PAGE 1 OF 1 **WALK-THROUGH DATE April 6th, 1988**

MATERIAL REVIEWED System Test Plan
SERVICE REQUEST # G.00.00 release

PARAGRAPH/ LINE/PAGE	DESCRIPTION	TYPE	RESOLUTION
Section 1	Incorrect version #	Error	Version number corrected
Section 1	Add specification of MPE version	Omission	MPE Version V-Delta-1 added to setup steps
Section 2	Add step to test various printer models	Omission	Steps to test thinkjet, 2934, paintjet, laser added
Section 3	Include unit test for search criteria change	Omission	Unit test plan added to section 3
Section 4	Step to initialize database should come before data extract step	Error	Steps rearranged
Section 4	Expand description of file manipulation steps	Clarity	Narrative updated and expanded

documents, code and test plans has been extremely beneficial for projects in our shop. Most of the projects within the department are implementing this process for at least some of their projects.

Teams hold walk-throughs on project investigation documents, new screen designs, new code and changes to existing code. In addition, walk-throughs on plans, user guides and even on important memos are held. The quality of all these products has been improved significantly by the process.

My team is quite insistent about walking through almost everything produced! Every program change, every test plan and every design document is reviewed. All user documentation also is reviewed. Each walk-through team includes a user representative; members from interfacing teams are frequently included.

Walk-throughs have helped us produce very high-quality code. With a system under maintenance with over 100K lines of COBOL, we have an average of five very minor defects found in each initial user test. We've had very few problems reported after the code is released to production and installed in all sites. These problems have never been large enough to warrant a "patch" release.

Of course, the main motivation for any project team to introduce walk-throughs is to improve software quality. However, our department as a whole has realized additional gains from the process.

First, programmers and support personnel are cross-trained. Even if an administrator is primarily responsible for online programs, he will become familiar with the batch portions of a system by participating in those walk-throughs. This helps reduce training time and reduces the impact of turnover within a team.

Also, walk-throughs allow experience and expertise to be shared through-

out the department. Programmers participating in walk-throughs for another project can lend their technical knowledge of a particular technique to that team. Communication within one team and between teams also is improved with walk-throughs. By actually examining specifications and code for modules with which they will have to communicate, programmers more fully understand the requirements for new code and for code changes.

Finally, code and documentation that has been reviewed in a walk-through is much easier to maintain in the future. As walk-through participants identify logic or explanations that are unclear, program and user documentation is clarified. This will mean less confusion the next time the same material must be enhanced or changed.

The best measure of success of walk-throughs will be their positive effect on your programs, your documentation and, ultimately, on your users!

IF YOU'RE GOING TO implement walk-throughs within your own shop, you may benefit from these recommendations based on our experiences:

■ *Make sure your staff understands the walk-through process.* Training is essential. You may wish to train your programmers and administrators informally by having them observe other teams conducting walk-throughs. Alternately, you may wish to train them formally through classes provided by your organization or by enrolling them in outside classes. Several organizations provide training in structured walk-through techniques.

■ *Ensure that all phases of a project are walked-through.* The earlier in a project walk-throughs are conducted the better. Review design, specification, code and test phases.

■ *Ensure that all project members' work is walked-through.* Don't limit the sessions to a mere review of junior team members' work. They'll feel singled out for examination. No one is perfect and walk-throughs will improve the quality of everyone's work.

■ *Create a non-threatening atmosphere during the meeting.* Make sure people understand that error identification is positive and that people won't be evaluated on the results of a walk-through.

And finally, most important:

■ *Ensure that time for walk-throughs is included in your schedule.* The time to distribute material, prepare for a meeting and conduct the meeting must be built into the project schedule. Our experience has shown that, far from adding time to a schedule, walk-throughs actually reduce it. Errors are caught earlier and therefore can be fixed more quickly. Participants must have the time up front, however, to review material and attend meetings.

Our experience with walk-throughs has been extremely positive. Programmers and administrators feel that time spent in reviewing material is time very well spent. Hopefully, the tips outlined above will help you successfully implement walk-throughs in your shop. The best measure of success of walk-throughs will be their positive effect on your programs, your documentation and, ultimately, on your users! — *Lisa Burns Hartman manages an internal business software programming team at Hewlett-Packard corporate headquarters, Palo Alto, CA.*

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QUIZ is good at producing reports, but it's slow at serially reading datasets. One customer used SUPRTOOL to reduce the elapsed time of his QUIZ report by five times. Interfacing QUIZ and SUPRTOOL takes three easy steps:

1. Use QUIZ to build an empty subfile.
2. Fill the subfile using SUPRTOOL.
3. Use QUIZ to report the subfile.

Find(Serial) in TRANSACT

Even with FASTRAN, your TRANSACT programs that serially read and select records from a dataset are slow. One customer used SUPRTOOL to produce his TRANSACT report three times faster. The SUPRTOOL User Manual shows the easy steps necessary to modify a TRANSACT program to use SUPRTOOL.

Nightly Jobs Still Running?

If you need to extract today's transactions from your two years of history, and you need to do it every night, SUPRTOOL is the perfect tool for you. SUPRTOOL can scan through enormous datasets quickly, selecting just the data you need.

```
:run suprtool.pub.robelle
>base store.pub
>get transaction-detail
>if trans-date=$today
>output dtrans.data
>exit
```

SUPRTOOL is compatible with Turbo IMAGE. The license fee is $3000, including one year of service. No charge for trial.

ROBELLE Consulting Ltd.

8648 Armstrong Road, R.R. #6
Langley, B.C. Canada V3A 4P9
Phone: (604) 888-3666 Telex: 04-352848

Australia 03.420.5400 England 01.262.5050 (x363)
France 06.907.7079 Germany 07621 791101
Holland 4242.15655 South Africa 021.61.9001
Sweden 08.35.4666 Switzerland 031.46.1664

CIRCLE 127 ON READER CARD

Continued from page 24.

be accommodated by developing segments that perform the special task.

Starting from an "empty" segment, which is fully interfaced to the system, the user often needs to write only a few lines of code to perform the special operation while leaving the routine tasks (e.g., input, output, spreadsheet display, graphics, data archiving/retrieval, error trapping, etc.) to DATA-TRACK.

DATA-TRACK ($1,200) runs on the 9000 Series 200/300 under HP PASCAL 3.0 or later versions. It requires a minimum 1 MB of memory, depending on the amount of data handled.

Contact Applied Research Assoc., 1954 Woodbury Ct., Walnut Creek, CA 94596; (415) 831-2320.

Circle 393 on reader card

HP 7963B Offers High Storage Capacity

Hewlett-Packard has announced the HP 7963B disc-drive subsystem, the newest member of its storage-product line.

The subsystem works with the 9000 workstations, 3000 CPUs and 1000 manufacturing systems, and provides users with easy upgrades, high storage capacity, high reliability and low cost of ownership.

The multimechanism design of the HP 7963B subsystem allows up to three 304-MB Winchester disc mechanisms to be placed in one compact package. After initial purchase of an HP 7963B subsystem with one disc mechanism, users later can install up to two additional HP mechanisms in the original package.

The foundation of the HP 7963B subsystem is HP's 5¼-inch Winchester disc mechanism, which features a 17-ms seek time and estimated 40,000 hours MTBF. The design and use of VLSI have reduced the number of components in this mechanism, resulting in high reliability.

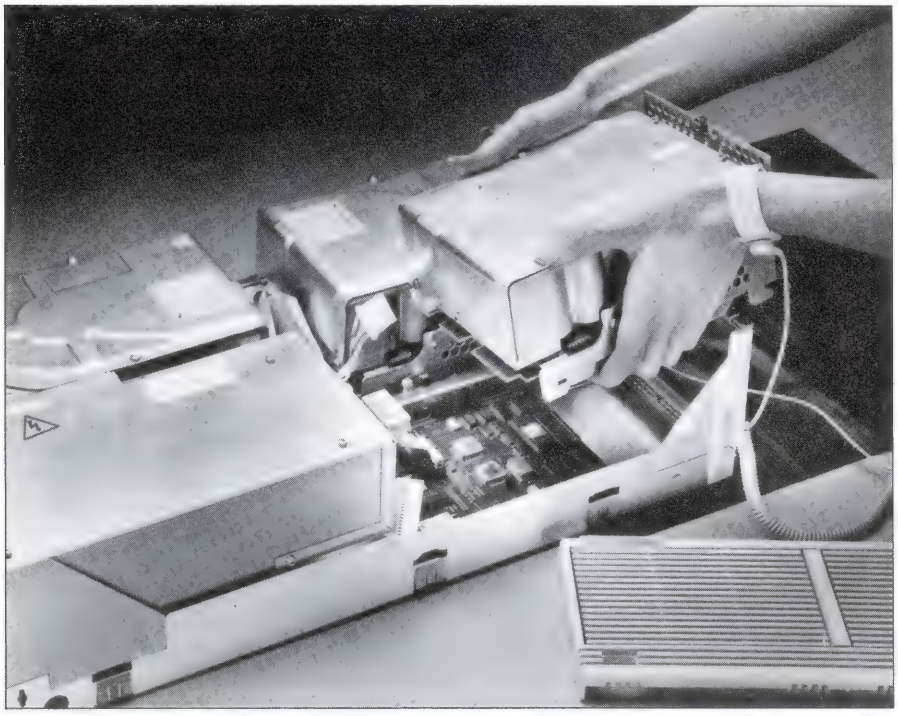
The HP 7963B is available from the factory with the capacity of 304 MB. You may buy additional HP mechanisms as upgrade kits for the original package as storage requirements increase.

The HP 7963B 304-MB subsystem ($10,750) comes with a power supply and intelligent controller. The HP 97963B upgrade kit ($7,050; HP 7975B 304-MB single-mechanism subsystem, $9,350) contains a controller as well. Both products feature a 17-ms seek time and burst-transfer rate of 1.25 MB per second.

Other features include a specially designed track-positioning system using embedded code, channel optimization, automatic sparing, self-test capabilities and easy access to replaceable assemblies.

Contact the Hewlett-Packard office listed in your telephone directory white pages.

Circle 397 on reader card



The new 7963B disc-drive subsystem features easy upgrade capability.

Pathfinder Integrates PowerHouse-Based Systems

Pathfinder Software Inc. has combined its PowerHouse-based Personnel and Canadian Payroll systems into one integrated package. This innovation addresses a growing demand for a 4GL database approach to employee management, position control and payroll costing.

Integrating Payroll with Personnel eliminates duplicate storage of common data and ensures that both departments keep their data in sync.

Payroll supports multiple payrolls and unions or non-union groups; accommodates multiprovince tax calculations, multiple shifts and crew schedules, unlimited deductions, direct bank deposit or printed cheques; and prints CEIC Record of Employment forms.

Personnel offers position tracking, automatic event history for positions and employees, applicant tracking, skills, leave management, job history, education history and free-form note files for miscellaneous information.

Contact Karen Conyers, Pathfinder Software Inc., 1577 West Georgia St., Vancouver, BC V6G 2V3; (604) 682-6633, FAX: (604) 682-3829.

Circle 389 on reader card

Tekbase Written For Engineers

Users of HP Series 200 and 300 workstations now have available a fully relational database that they can make use of directly from BASIC. Tekbase has been written specifically for engineers and scientists and is capable of handling vast quantities of data in the order of gigabytes.

The programmer has access to all functions via the Query Language, which has the ability to manipulate data using mathematical functions not normally available in languages such as IBM's SQL.

In many cases, Tekbase can retrieve faster than BASIC coding and write data almost as fast. For those who don't want to write their own programs, a version of Tekbase is available that provides a complete package with comprehensive 2-D and 3-D Graphics, Report Writer, Datacommunications tools, etc.

Contact Protek, 10 Grosvenor Pl., London SW1X 7HH; telephone 01 245 6844.

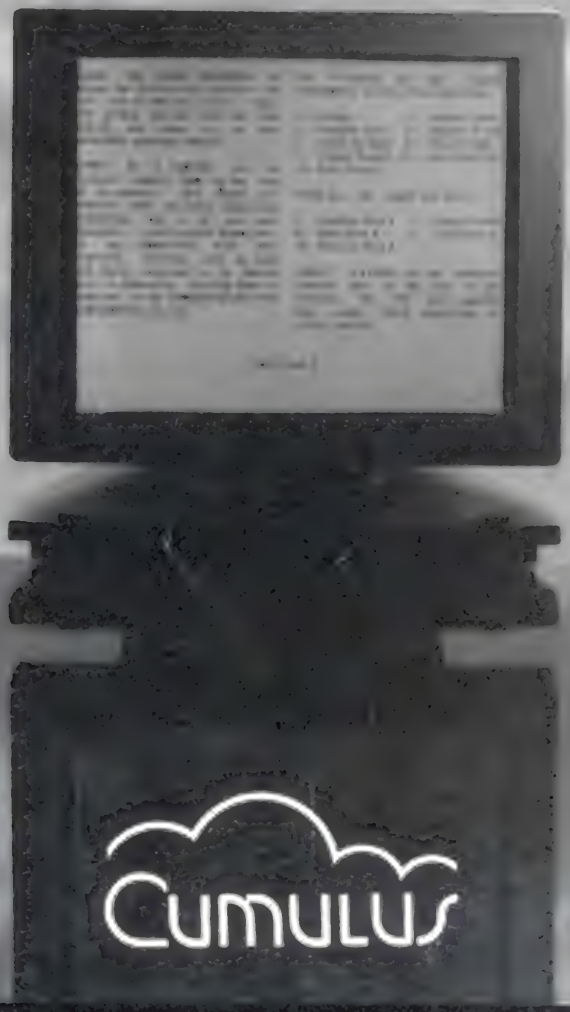
Circle 371 on reader card

VISIONARY BREAKTHROUGH. BUDGETARY GENIUS.

See and compare the Cumulus difference for yourself.

Compare how we've combined a big 15″ display, crisp 13 × 16 character matrix, and 75 Hz refresh rate to create a *visionary breakthrough* for HP block mode terminal users.

And compare how we've put that performance together with a price and five year warranty package including a next day turnaround on repairs that will make you a *budgetary genius*.



Cumulus Technology Corp., 1007 Elwell Court, Palo Alto, CA 94303, (415) 960-1200

© 1988, Cumulus Technology Corporation

CIRCLE 169 ON READER CARD

Accel-500 Expedites Office Printing

Advanced Matrix Technology (AMT) has announced the Accel-500 printer.

The Accel-500 ($1,185) can handle a broad range of office printing tasks, from 480-cps draft printing to combining letter-quality text with high-resolution color graphics. A user-friendly dash controls all functions and it offers plug-and-play compatibility with most software programs on the market.

Instead of confusing DIP switches, key sequences or menus, the Accel-500 has a 16-digit liquid-crystal display with plain-English messages, buttons with clearly marked functions and an industry-exclusive Select-Dial for making selections and moving paper.

Standard features include a 24-pin pinhead, addressable seven-color graphics, built-in forms tractor, a large font library, five co-resident printer emulations and plug-in Intelli-Card for instant upgrades. Memory is expandable to 500 KB RAM.

The Accel-500 may be configured with drivers for a variety of special applications including HPGL, Convergent's CTOS, Unisys' BTOS and DEC's LQP02/LA210/LA120 series.

Contact Advanced Matrix Technology, 1157 Tourmaline Dr., Newbury Park, CA 91320; (805) 499-8741.

Circle 387 on reader card

The Accel-500 printer combines letter-quality text with high-resolution graphics printed in seven colors.

SFC Controls Factory Operations

MCBA Inc. has announced the release of its Shop Floor Control (SFC) package for the HP 3000.

SFC, a key component in what will be an 18-module accounting, distribution and manufacturing system, is designed to control the flow of work on the factory floor, keeping track of materials, operations, labor and tools.

The package will help manufacturers reduce production and inventory costs by allowing them tighter control over their day-to-day operations. The package will aid in scheduling shop orders. Users can set up multiple shop calendars, grouping shop orders for any combination of weeks, months or years.

SFC ($6,000 to $9,000 depending on hardware configuration) is the thirteenth package in the series to be completed. The full system will feature an integrated Manufacturing Resource Planning (MRP II) system, suitable for job shops and repetitive manufacturers in the $1- to $100-million revenue range.

Contact MCBA, 425 W. Broadway, Glendale, CA 91204-1269; (818) 242-9600.

Circle 391 on reader card

HP Introduces PC Video Graphics Subsystem

Hewlett-Packard recently introduced its highest performance video graphics subsystem for personal computers.

The new system offers more colors, sharper text and graphics and faster processing of images.

The HP Video Graphics Subsystem includes either a color monitor that displays up to 256 colors simultaneously or a monochrome monitor that shows up to 64 shades of gray, and a video graphics adapter (VGA) that operates with either monitor.

The new graphics products are fully compatible with IBM's VGA standards. They can be used with all HP Vectra PCs, as well as other personal computers based on industry standards. The Video Graphics Subsystem is designed for business and entry-level CAD/CAE applications.

The HP VGA, the central component of the graphics subsystem, is compatible with software written for the monochrome display adapter (MDA), color graphics adapter (CGA), enhanced graphics adapter (EGA) and VGA standards.

The VGA is one of the few graphics adapters on the market that is compatible with software written for the Hercules Graphics Card.

Contact the Hewlett-Packard sales office listed in the white pages of your telephone directory.

Circle 369 on reader card

FASTdisc Eliminates Data Transfer Delays

Digital Electronic Systems recently announced FASTdisc, a RAM-based electronic disc device that eliminates data transfer delays associated with mechanical disc drives.

FASTdisc is used like a disc, but performs like RAM. It combines the speed of RAM-disc with constant data backup to a mechanical disc. Access time is .02 milliseconds, since access is directly to RAM. Performance is improved 50 to 250 times over the highest speed hard disc drives, even those employing cache.

FASTdisc ($4,875; additional 4-MB boards, $1,056; 16-MB boards, $6,390) features include fast access, data transfers of 40-MB/second, Fixed or Removable media, expandable from 4 MB to 589 MB, and SCSI Interface per ANSI X3.131.

FASTdisc operates with any computer using a SCSI interface.

Contact Digital Electronic Systems, Product Development, 302 South Main, Estill Springs, TN 37330; (615) 649-5137.

Circle 390 on reader card

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FLEXIBASE can analyse the content and structure of your IMAGE data bases and will automatically suggest how their performance can be improved. It contains facilities to implement the recommendations because it is also capable of transforming the structure of data bases to meet new application requirements or operational needs. In addition FLEXIBASE can do quick capacity changes, fix broken chains, repack data sets and much more. Not only is FLEXIBASE more powerful than any other data base management utility but also it is priced at a level that all HP3000 users can afford.

Flexibase

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MICHIGAN 48302 TELEPHONE 313 333 7200

CENTRAL COURT KNOLL RISE ORPINGTON
KENT BR6 0JA ENGLAND
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IMAGE is a trademark of Hewlett Packard Company

CIRCLE 214 ON READER CARD

High Quality HP Computer Supplies At Low, Low Prices!

Stop paying more for your high quality HP computer supplies! All orders are shipped within 24 hours of your call, no minimum purchase required. Call for prices on a wide assortment of other supplies not listed in this ad.

Diskettes (10/bx)

Sony 3.5" SS	18.95
Sony 3.5" DS	27.95
Sony 5.25" MD-2DD DSDD (96 tpi)	24.95
Sony 5.25" MD-2HD DSHD	29.95

Supplies

3.5" Disc File Holder	15.95
5.25" Disc File Holder	19.95
Inkjet paper (500 sheets)	8.95
HP92261A Inkjet cartridges	8.95
HP10833B 2 meter HPIB cable	80.95
HP92205Y HPIB ABC Switch box	229.95

Plotter Supplies

Multi-Media plotter pens (4/pk)	3.95
Multi-Media plotter pens (5/pk)	4.75
Rollerball plotter pens (4/pk)	7.95
Disposable plotter pens (4/pk)	15.50
Premium gloss paper 8.5x11	4.95
Plotter bond paper 8.5x11	3.75

Memory Boards Series 9000 200/300

1 Mbyte RAM board	649.00
2 Mbyte RAM board	1249.00
4 Mbyte RAM board	2549.00
8 Mbyte RAM board	5419.00
2 Mbyte Error Correcting RAM	1749.00

Peripherals

HP7475A 6 pen plotter, B size HP2225A Thinkjet printer	Call for prices

Data Cartridges

3MDC600HC 600' Data Cartridges	26.95
3MDC615HC 150' Data Cartridges	23.95
HP88140LC 600' Data Cartridges	37.00
HP88140SC 150' Data Cartridges	27.00

Questions? Talk to our friendly technical staff for help on all your HP supply needs. Visa and MasterCard accepted. $2.00 shipping charge for orders under $100.00. Call or write for school and government discounts.

pcm

P.O. Box 3482
Thousand Oaks, CA 91359
805-482-5585

CIRCLE 138 ON READER CARD

QueryCalc 1.0 Introduced For HP 3000

AICS Research has announced Release 1.0 of QueryCalc, a TurboIMAGE report writer for the HP 3000 organized as a 26-page, three-dimensional spreadsheet. Every cell in QueryCalc may be either a text label, numeric equation, text equation or query question into any of 10 open IMAGE databases, local or remote.

QueryCalc looks and behaves like most common spreadsheet programs, but extracts information directly from IMAGE databases into spreadsheet cells using near-English commands. It allows the construction of summary reports two to 30 times faster than through the use of 3GLs or 4GLs, taking advantage of the non-procedural, open nature of a spreadsheet.

QueryCalc is 3000-resident, requires only the use of standard HP terminals and will run on the smallest 3000. Graphics are supported on LaserJet Plus/II/2000, DeskJet and PaintJet printers. Text only may be outputted to any flat ASCII file, terminal or printer connected to the 3000.

Contact AICS Research Inc., Drawer 3BY, University Park, NM 88003; (800) AICS-INC, (U.S.), Outside U.S., (505) 526-6842.

Circle 388 on reader card

PLUS10 Model 92 Emulates HP 2392A Terminal

A new data terminal for HP computers has been announced by Houston Computer Services (HCS).

The PLUS10 Model 92 CRT is a compact terminal that provides compatibility with HP's proprietary 2392A and 700/92 terminals.

By emulating the 2392A terminal, the PLUS10 Model 92 CRT ($699) may be used with HP 3000 Series computers and other HP computers that require the 2392A block mode terminal.

It is a desktop video display terminal with a tilt and swivel display, detached keyboard featuring HP-compatible keys and a printer port. Compatible with the 2392A in native mode, the Model 92 supports standard HP block mode software such as VIEW/3000.

Standard features of the terminal include 2392A character-mode and block-mode compatibility; built-in external device (printer) port; a keyboard that's key-for-key identical with the HP terminal; 14-inch display with true tilt and swivel; flicker-free 65 Hz refresh rate and a choice of green, white or amber display screen.

Contact Houston Computer Services Inc., 11001 South Wilcrest, Suite 200, Houston, TX 77099; (713) 568-9900.

Circle 386 on reader card

PC/INFORM Monitors Computer Room Conditions

Data Communications Specialties (DCS) has announced PC/INFORM, a PC-based room environment and computer monitoring system.

The system is capable of monitoring 24 or more different conditions related to power status, room temperature, humidity, critical data communications equipment, as well as HP 3000 status such as database and disc capacities, batch job progress, or any user-definable condition.

PC/INFORM continuously monitors the environment and computer equipment and, based upon user-defined criteria, will make informative telephone calls to the correct individual in a non-robotic, digitally stored voice.

Contact Don or Chris, DCS, 3349 Bien Ct., San Jose, CA 95148; (408) 270-2733 or (408) 248-8870.

Circle 385 on reader card

EMC Reduces Falcon Series Prices

EMC Corporation has announced a price reduction of up to 16 percent on all its Falcon Series Disk Subsystems. The new pricing from EMC reflects a savings of up to 25 percent compared to the similar offering from Hewlett-Packard.

EMC also has announced an "uncached" option of the Falcon to accommodate HP users who prefer to purchase a Falcon without the 4 MB of cache. The option is available on all four Falcon models and is priced $1,500 less than the cached version.

Contact EMC Corp., Hopkinton, MA 01748-9103; (800) 222-EMC2; in Massachusetts, (617) 435-1000; in Canada: EMC Corp., 5407 Eglinton Ave. West, Etobicoke, Ontario M9C 5K6; (416) 620-7777.

Circle 383 on reader card

New Device Drivers For Lotus Software

Lotus Development Corporation recently announced several new device drivers for Freelance Plus and Graphwriter II, including drivers for laser and dot-matrix printers

(color and black-and-white), plotters and IBM's VGA graphics display card.

In addition, the company announced the shipment of a 3½-inch version of Freelance Maps, which has been consolidated from five packages into two.

The new device drivers for Freelance Plus and Graphwriter II support a broader variety of popular output devices such as HP's DeskJet ink-jet printer and DraftMaster I plotter, Canon LBP-8II laser printer, Epson JX-80 color dot-matrix printer, NEC P560/P565 dot-matrix printer, NEC P560XL/565XL color dot-matrix printer, Toshiba P351C color dot-matrix printer, Xerox 4045 Model 50 laser printer and the IBM Video Graphics Array (VGA) graphics display card.

Contact Lotus Development Corp., 55 Cambridge Pkwy., Cambridge, MA 02142; (617) 577-8500.

Circle 382 on reader card

KLA/Express Offers User-Defined Options

KLA & Associates Inc. has announced a new version of KLA/Express-3000. Version 5.0, which also will be the MPE/XL version of the software, is menu-driven and uses function keys in order to accommodate the expanded capabilities.

New features include expansion of six options to 27 (six user-defined and six reserved for future expansion); an additional level within a queue to hold a process at its pseudo limit; permanent/temporary option when automatically transferring a process to another circular queue; process aborts based on CPU seconds and/or elapsed minutes; immediate notification to specified users/managers of potential and/or pending problems; continuous monitoring and notification to specified users for outstanding console replies and MPE disc caching controlled by user-specified parameters per drive. It displays online continuous CPU utilization in detail and summary formats and displays critical information about the CPU and KLA/Express on every screen. It has user control over key timing functions and over 40 help categories and teaching modules.

Contact KLA & Associates Inc., P.O. Box 14854, Clearwater, FL 34629-4854; (813) 784-5976.

Circle 381 on reader card

9330 Series Enhances Network Management

Codex Corporation has announced the Codex 9330, a fully integrated network

Share Laser Printers

Share any printer.
Laser, letter quality, plotter, dot matrix, even FAX.

Connect any PC/any application.
Even provides a 3287 link between your laser and a mainframe.

Set up is easy.
Reliable and familiar asynchronous connections plus Auto-Install to get you going quickly.

Popup menus for instant access.
Easy-to-understand, the popups let you access the full functionality of PrintDirector from within any application.

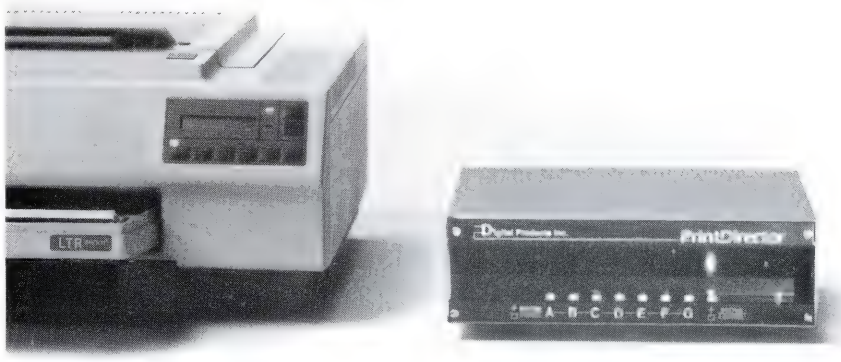
Printer Management.
Make printer use easier to manage and get better looking documents with printer feature selection libraries, font selection, collated copies, tray control, forms selection, resource utilization reporting, even use different types of printers with Printergration.

Call Digital Products today: 1-800-243-2333; in California: 1-800-247-2006.

PrintDirector

Digital Products, Inc., 108 Water Street, Watertown, MA 02172 617-924-1680

PrintDirector is a trademark of Digital Products Inc.



CIRCLE 107 ON READER CARD

REPRINTS? If you would like reprints of any article or advertisement, contact the Production Department or your Regional Sales Manager at:
HP PROFESSIONAL, P.O. Box 445, Spring House, PA 19477 - (215) 542-7008

management system. It provides increased device control and a number of features new to small network management systems.

Codex's first release of the 9300 Series provided modem management support, while the 9330 supports Codex's statistical and digital time-division multiplexers as well. The support is truly integrated with a consistent interface to the operator and end-to-end management of devices.

The Codex 9300 Series is a PC-based network management system for small- to medium-sized networks (for example, up to 12 Codex 6740 nodes and 200 transmission devices), combines sophisticated full-color graphics, multiple concurrent windows and operator help, controlled through a PC mouse.

The Codex 9330 features time-based functions, online trouble ticketing, configuration improvements, command and status screen, terminal emulation and more advanced hardware. The system includes an HP Enhanced Series PC with a 12-MHz CPU, 40-MB internal disc, 1.2-MB diskette drive, color monitor, mouse and printer.

Contact Codex Corp., 20 Cabot Blvd., Mansfield, MA 02048-1193; (617) 364-2000.

Circle 380 on reader card

CAPMGR/3000 Monitors Dataset Capacities

Idaho Computer Services Inc. has released CAPMGR/3000, the dataset capacity manager for IMAGE and TurboIMAGE databases for the HP 3000.

CAPMGR/3000 ($550) monitors and maintains dataset capacities to prevent full datasets. Capacity changes are accomplished utilizing the user's capacity change program. Using the STREAM facility to execute CAPMGR, the preventive maintenance activity may occur at the user's discretion.

The user also assigns the method of dataset management. CAPMGR/3000 provides three different methods to determine dataset capacities.

The first method enables users to establish a percentage of free space. The percentage of free space will be compared to user-defined percentage variables, ensuring that master and automatic master datasets have the free space they need for hashing efficiency.

The second method involves establishing a user-defined number of free space entries for a specific dataset. The number of free space entries will be compared to user-defined free space entry variables.

The third method utilizes artificial intelligence techniques to project dataset capacities based on statistical trends of dataset activity. Using statistical formulas, the new capacity is projected using dataset activity history. Activity data automatically collected each night is used to calculate future capacity requirements.

Contact Idaho Computer Services Inc., P.O. Box 446, Twin Falls, ID 83303-0446; (208) 734-2245.

Circle 379 on reader card

Low-Cost Memory Available For DeskJet

Pacific Data Products has announced the availability of low-cost memory cartridges

MEGAMEMORIES™

When you think of memory, think of MARTINSOUND TECHNOLOGIES

Save up to 60% with our wide selection of affordable high performance memory subsystems for HP 9000 Series 200/300 computers.

RAMDISK – a 1 Megabyte memory board that functions just like a disk drive. Martinsound has utilized state-of-the-art low-power RAMs to give you a non-volatile type memory system that is many times faster than any disk-based system. And, you can boot your system direct from RAMDISK.

RAMDISK — the ideal alternative to high-cost non-volatile memories like EPROMs or bubble memories. By virtue of its battery back-up (3 year life - minimum), it is the clear choice over disk-based memory for any harsh environment.

Attention HP Viper Language Processor users —
MARTINSOUND now has affordable memory kits for your HP Viper Basic and Pascal Language Processor Cards — call for information!

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FAX: 818-284-3092

CIRCLE 129 ON READER CARD

Welcome to the next generation of HP terminal emulation software for Macintosh.

Tymlabs is pleased to introduce **Session**, a family of emulators which links the Apple Macintosh to the HP3000, 9000 and 1000. Building on four years of experience with Mac2624, our original block mode product for the Mac, we have evolved a set of connectivity solutions which take advantage of the revolutionary developments in Macintosh hardware and software, offering unprecedented power and user friendliness.

Business Session™ (formerly Mac2624) is the foundation of the family, emulating an HP 2392 block mode terminal. Business Session runs under Apple's MultiFinder, so you can flip between HP and Mac applications, performing terminal operations and file transfers in background mode. **Graphic Session**™ adds support for the graphics capabilities of the HP 2393, and lets you "plot" output on an Apple LaserWriter or ImageWriter, either directly or from another Mac application. **Color Session**™ gives you the color text and graphics capabilities of the HP 2397.

If you've got a Mac, get Session. There is no better HP terminal emulator. If you haven't got a Mac, get one. There is no better personal computer.

Session. From Tymlabs.

CIRCLE 128 ON READER CARD

Tymlabs

Tymlabs Corporation ■ 811 Barton Springs Road ■ Austin, Texas 78704, U.S.A. ■ (512) 478-0611 ■ Telex 755820
Tymlabs-APPIC ■ 123 Rue de Petit-Vaux ■ 91360 Epinay sur Orge, France ■ (1) 64-54-82-32 ■ Telex 603409
Wick Hill Associates Limited ■ 42A-44 High Street ■ Egham, Surrey, England TW20 9DP ■ 0784-38441 ■ Telex 268764
Megatec Pty., Ltd. ■ 2 Brunswick Road ■ Mitcham Victoria 3132, Australia ■ (03) 874-3633 ■ Telex 152692

Business Session, Graphic Session and Color Session are trademarks of Tymlabs Corporation.

for the HP DeskJet printer. The DESK RAM cartridge ($129) is fully compatible with the DeskJet and expands memory capacity to 128K or 256K.

The DeskJet printer is equipped with two option slots for expansion memory or font cartridges. Extra memory is required to use HP's extensive line of soft fonts. Two memory cartridges can be used simultaneously for a total of 256K. More than 128K of memory may be required because a single point size can use over 50K. HP recommends using two cartridges for popular fonts such as Helvetica. DESK RAM cartridges are user-installable and compatible with the use of hard font cartridges.

Contact Pacific Data Products, 8525 Arjons Dr., Suite M, San Diego, CA 92126; (619) 549-0922.

Circle 378 on reader card

Lasersoft/3000 Enhances LaserJet 2000 Support

Business Systems International has released a new version of Lasersoft/3000, the software package that allows users to create electronic forms and use them with HP 3000 applications to replace preprinted forms.

Release 1.1 includes features that enhance the use of electronic forms with the 20-ppm HP LaserJet 2000 printer. Included is support for form switching in the duplex printing mode, which allows users to print on both sides of a page and use a different form overlay for each side. It also supports the use of electronic forms on 11x17-inch (ledger-size) paper.

Lasersoft/3000 includes a forms composition module that allows electronic form files to be created and maintained on the HP 3000. It also includes a printer management module, which allows forms and soft fonts to be downloaded to the laser printer either from an online selection program or by a batch job that can be executed by itself or as part of an application job stream. Merging electronic forms with data from existing application programs requires little or no modification.

Lasersoft/3000 operates on all HP 3000 series computers and works with the entire LaserJet/Plus printer family.

Contact Business Systems Intl., 20942 Osborne St., Canoga Park, CA 91304; (818) 998-7227.

Circle 377 on reader card

3+Reach/MCI Provides Software Gateway

3Com Corporation has begun shipping 3+Reach/MCI, an extension to 3Com's 3+ network operating system that provides a software gateway between 3Com's 3+Mail and MCI's electronic mail service.

3+Reach/MCI ($595) enables 3+ network users with 3+Mail to exchange messages with MCI Mail's more than 100,000 users, telex addresses worldwide and any postal address with MCI postal delivery capabilities.

3+Reach/MCI also allows connection to users of Hewlett-Packard's HPDesk, IBM's PROFS, DEC's ALL-IN-1, Wang Laboratories' Wang OFFICE and other electronic mail systems accessible from an MCI gateway.

3+Reach/MCI allows 3Com's 3+Mail users to send messages with attachments from an IBM PC, PC-compatible, PS/2, Macintosh Plus, Macintosh SE or Macintosh II.

Contact 3Com Corp., 3165 Kifer Rd., Santa Clara, CA 95052-8145; (408) 562-6400.

Circle 373 on reader card

Unitech Announces USECURE 2.0

Unitech Software Inc. has released USECURE 2.0, an enhanced version of its system security and administration product for UNIX-based computers.

The USECURE enhancements provide greater access control and accountability for the UNIX operating system and give users more complete auditing procedures for security-related functions. Some of the newly added features include the ability to restrict command access on a per-user basis, monitor and log access to certain selected programs, provide secondary login and password authentication, set time limits for user sessions, and automatically log out an inactive terminal.

USECURE ($400—$4,000) provides automatic system management reports such as automatic password generation, control of various administrative files, disc utilization reports and automated system startup and shutdown procedures.

Contact Unitech Software, 1800 Alexander Bell Dr., Suite 101, Reston, VA 22091; (703) 264-3301.

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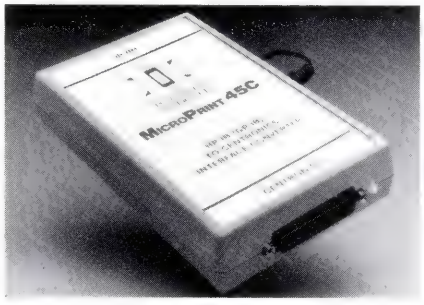

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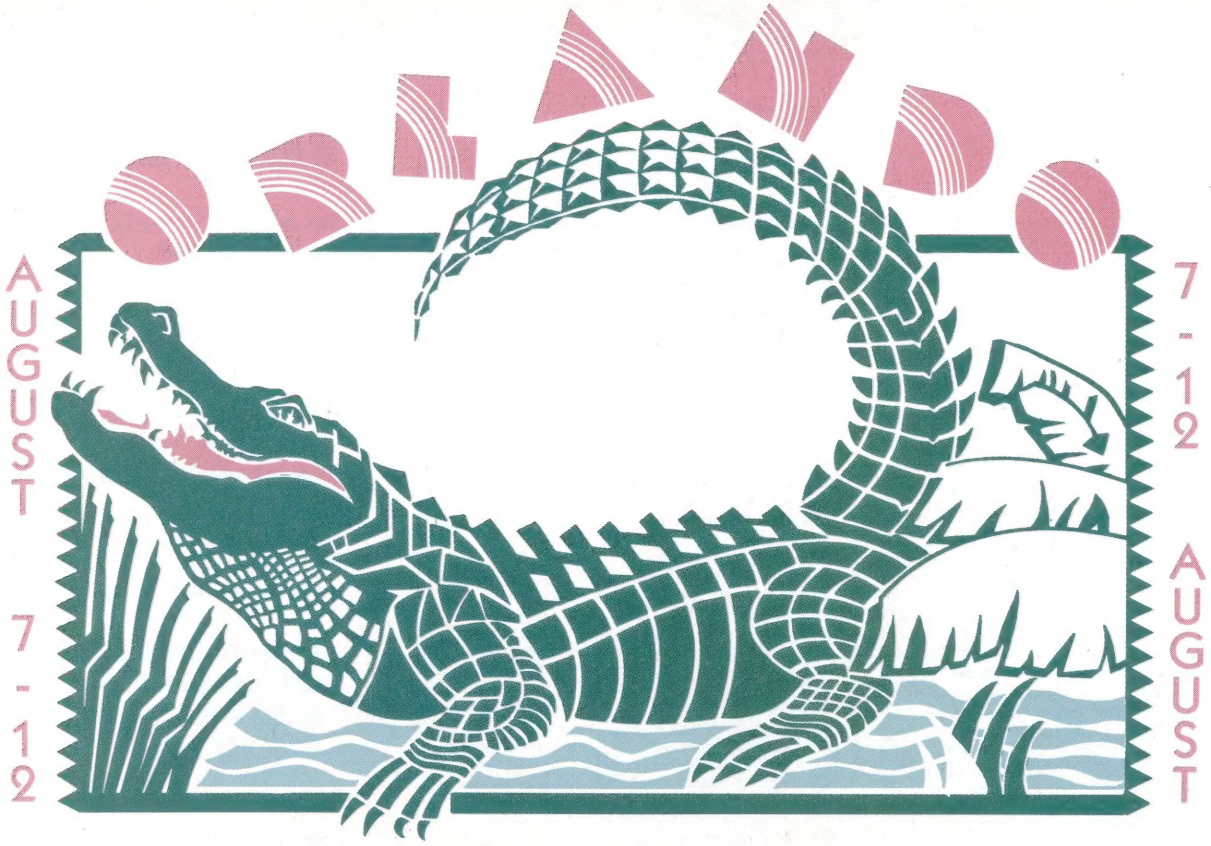

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[JUNE]

9 & 20: Time Line Workshop (Project Management Software), sponsored by Symantec Corporation, Breakthrough Software Division; 9:00 a.m. - 5:00 p.m., Know How Inc., 901 Market St., Suite 250, San Francisco, CA. $195 per participant including diskette and workbook. Contact Sherri Davis, Training and Consulting Division, (415) 898-1919.

13-15: CAP International's 1988 European Electronic Printing Industry Conference — Converging Markets: Computer Applications, Printers, and Color Output Devices; Amsterdam Hilton, Amsterdam, Holland. Contact Martha Johnson, CAP International, One Snow Rd., Marshfield, MA 02050; (617) 837-1341.

16: MINNRUG (Minnesota Regional Users Group) Breakfast Meeting, 7:00 a.m., Hewlett-Packard, St. Paul, MN. Topic to be announced. Contact Jim Gonsoski, (612) 379-0039.

[JULY]

3-11: HPCUA Limited (Hewlett-Packard Computer Users Association) national conference, Spa Complex, Scarborough, England. The theme of the conference is "Charting New Lands" and refers to the recent volume shipments of HP's latest commercial Precision Architecture minicomputer, the Series 950, and the development of NewWave for IBM/AT-compatible PCs. Over 100 exhibitors at accompanying trade exhibition. Contact HPCUA Limited, The Twenty One Building, 21 Pinner Rd., Harrow, Middlesex HA1 4LH; Telephone: 01-427-5100.

11-12: Performance Maximization Seminar, Los Angeles. HP 3000-related seminar sponsored by Volz Associates. Contact Charles H.R. Volz, Volz Associates Inc., 15 Pauline St., Winthrop, MA 02152-3011; (617) 846-3837.

21-22: Middle Atlantic Regional Users Group Raleigh Conference. The theme is Operations Update. Sessions will be intended to help members improve the operations of their Data Centers. Details will be announced at a later date.

[AUGUST]

7-12: Interex North American Business and Technical Conferences, Orlando, FL. Call (408) 738-4848.

18: Greater Houston Regional Users Group Inc. quarterly meeting, Hobby Hilton, 8:00 a.m. - 5:00 p.m. Contact Suzanne Spitzer, program chairman, (713) 977-3193.

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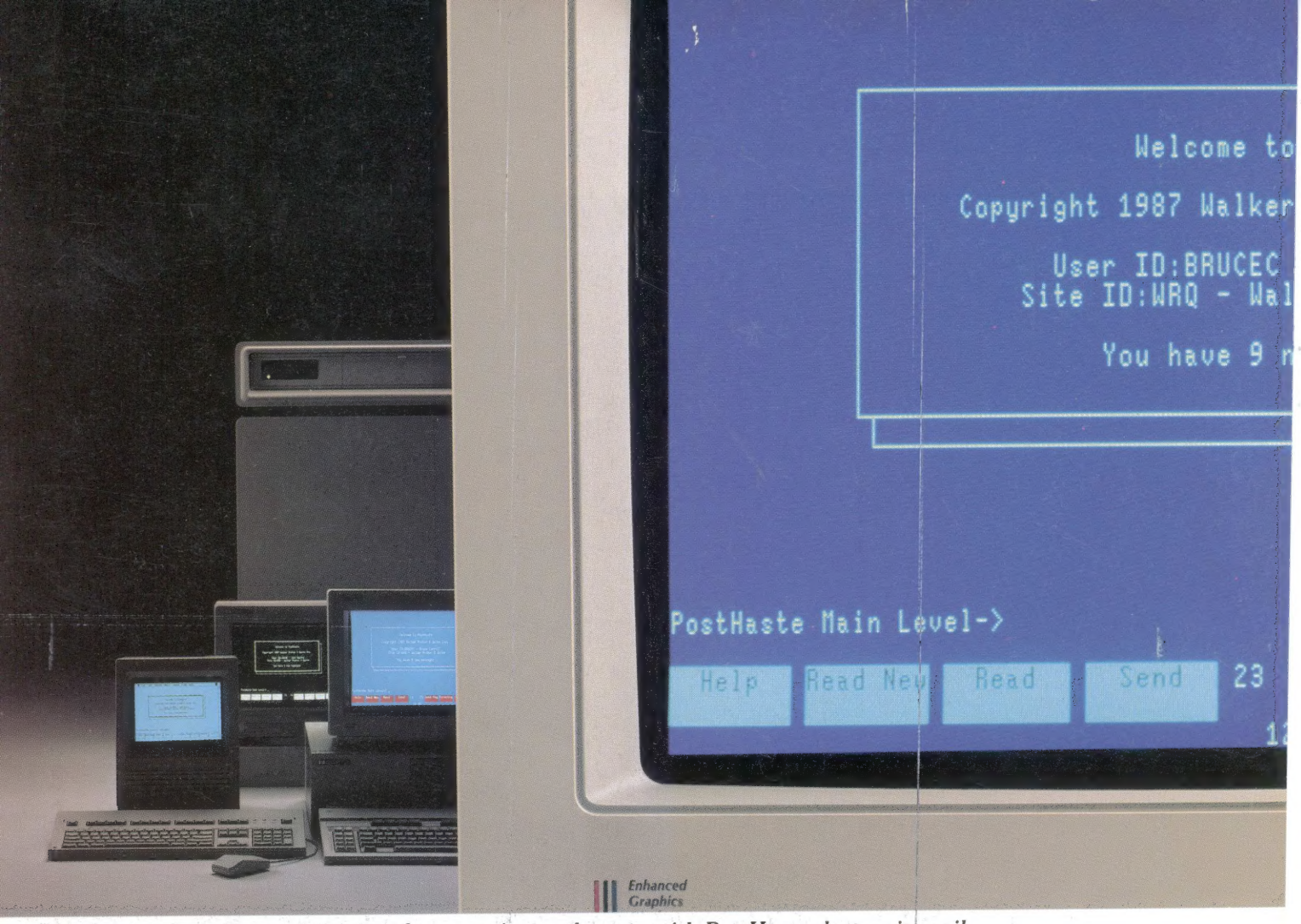

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